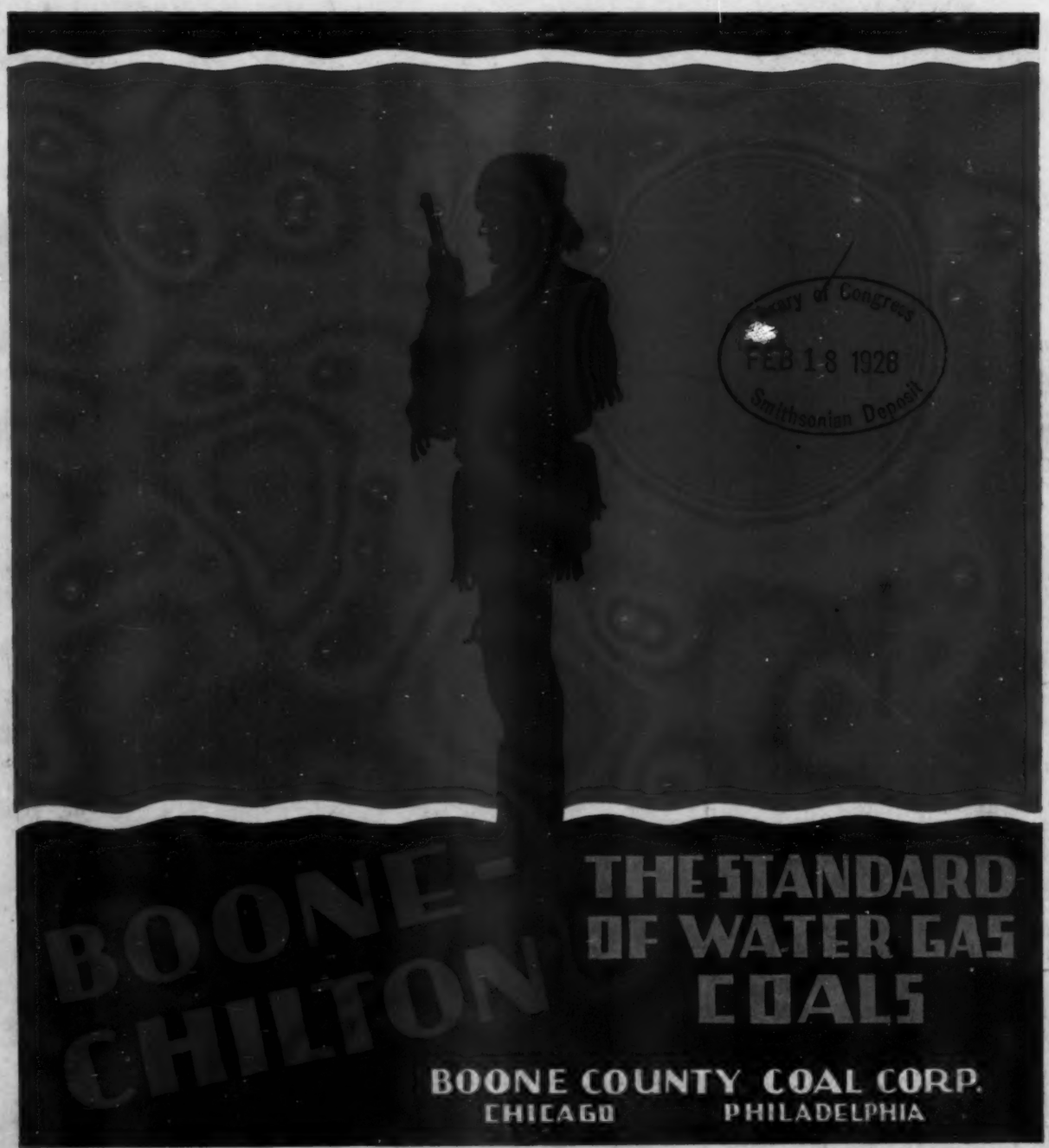
Vol. 128. No. 2 FEBRUARY, 1928 Price 25 Cents

10048

AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Including · GAS INDUSTRY · Est. 1900 ·



Library of Congress
FEB 18 1928
Smithsonian Deposit

THESE CAN BE YOURS!

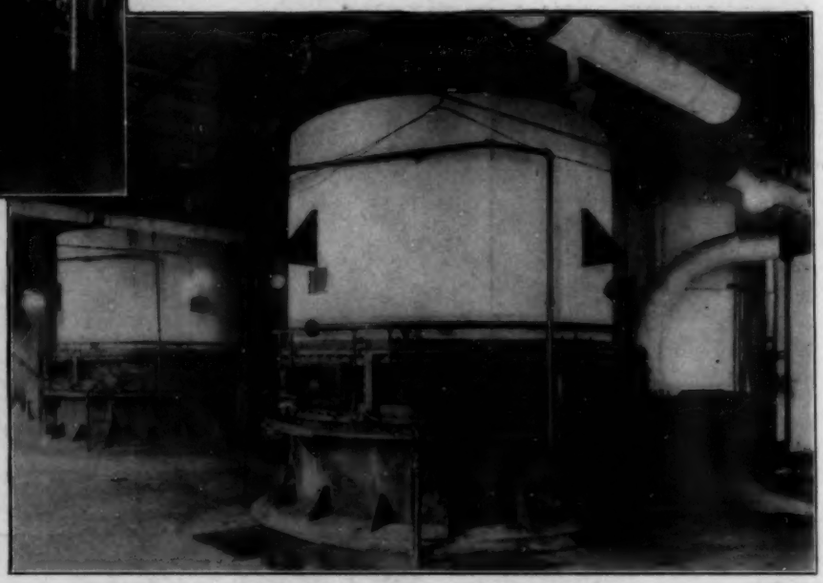
Labor Saving - Improved Operation
Increased Capacity - Less Fuel and Oil

These Two Machines will accomplish this

THE A-B-C SELF-CLINKERING WATER GAS GENERATOR

and HOWARD AUTOMATIC CHARGER

These two machines, developed from intensive research and experimentation by the Western Gas Construction Company into all phases of water gas generation, have demonstrated, after two years of practical operation, that fully automatic water gas generation as provided by these two pieces of apparatus is wholly successful.



To be progressive, — to operate economically and efficiently, to increase the profit on the send-out, — is to adopt these two rugged, time, fuel and oil saving machines.

It will pay you to send for our 24-page Booklet, describing in minute detail how the A-B-C Self-Clinkering Water Gas Generator and Howard Automatic Charger accomplished this and the manifold advantages that result from their use.

THE WESTERN GAS CONSTRUCTION COMPANY

FORT WAYNE, INDIANA.

Vol. 128. No. 2 Whole Number 3650

American Gas Journal

Sixty-Ninth Year

February, 1928

Published Monthly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

S. G. KRAKE, Pres. and Treas. H. M. RILEY, Editor
R. S. McBRIDE, Consulting Editor
Washington, D. C. A. M. GLEASON, Sec'y.

OPPORTUNITY KNOCKS

During the next several months there will be held at various places throughout the country meetings and conventions of the local gas associations. These gatherings offer a splendid opportunity for a great number of gas men to further inform themselves as to the latest improvements and advancement in the industry.

Gas company executives should be reasonably liberal in sending their employees to such meetings, thereby not only guaranteeing the success of the meetings, but also developing their men to the end that their own particular company will profit.

The men in attendance owe it to all concerned to enter into the spirit of the occasion by way of sitting in at the reading of papers and, what is more to the point, contributing their discussion and ideas. On their return home, if they feel that the papers have not been up to standard, they should indicate such and endeavor to write a paper themselves for the next meeting. The younger men should be advised of the fact that no set of men has a monopoly on convention paper writing, otherwise the art would be a lost one in a few years' time.

Let us all make the most of the opportunity that conventions afford.

TABLE OF CONTENTS

Editorial 23

The Effect on Combustion and Efficiency of Replacing the Grid of an Open-Top Gas Range with an Attachable Solid Top—By J. H. Eiseman..... 27

Moulding Public Opinion—By R. J. W..... 33

A Year's Experience with a Demand Rate for Gas House-Heating—By H. C. Deffenbaugh..... 38

The Relation of a Collection Department to a Public Service Organization—By B. C. Reber..... 42

Measuring Destructive Earth Currents—By K. H. Logan 44

Low-Temperature Coking of Canadian Coal..... 47

Association Activities 48

Annual Mid-Year Meeting New Jersey Gas Association 49

Book Review 54

Technical and General Miscellany for the Busy Gas Man 59

Developing Sales of Hotel and Restaurant Equipment in Places Other Than Hotels and Restaurants—By C. H. French 63

Justifying the Home Service Department—By Daurice F. Darling 65

Capitalizing the Extra Day in February—By Ray Martin 68

Matlack's Merchandising Memoranda..... 69

Of All Things—By W. H. Emm..... 71

Determining the Future of the Wholesale Use of Gas—By Elmer B. Dunkak..... 72

Equipment News 74

Happenings of Former Days..... 76

News of the Gas Industry..... 78

Personals 84

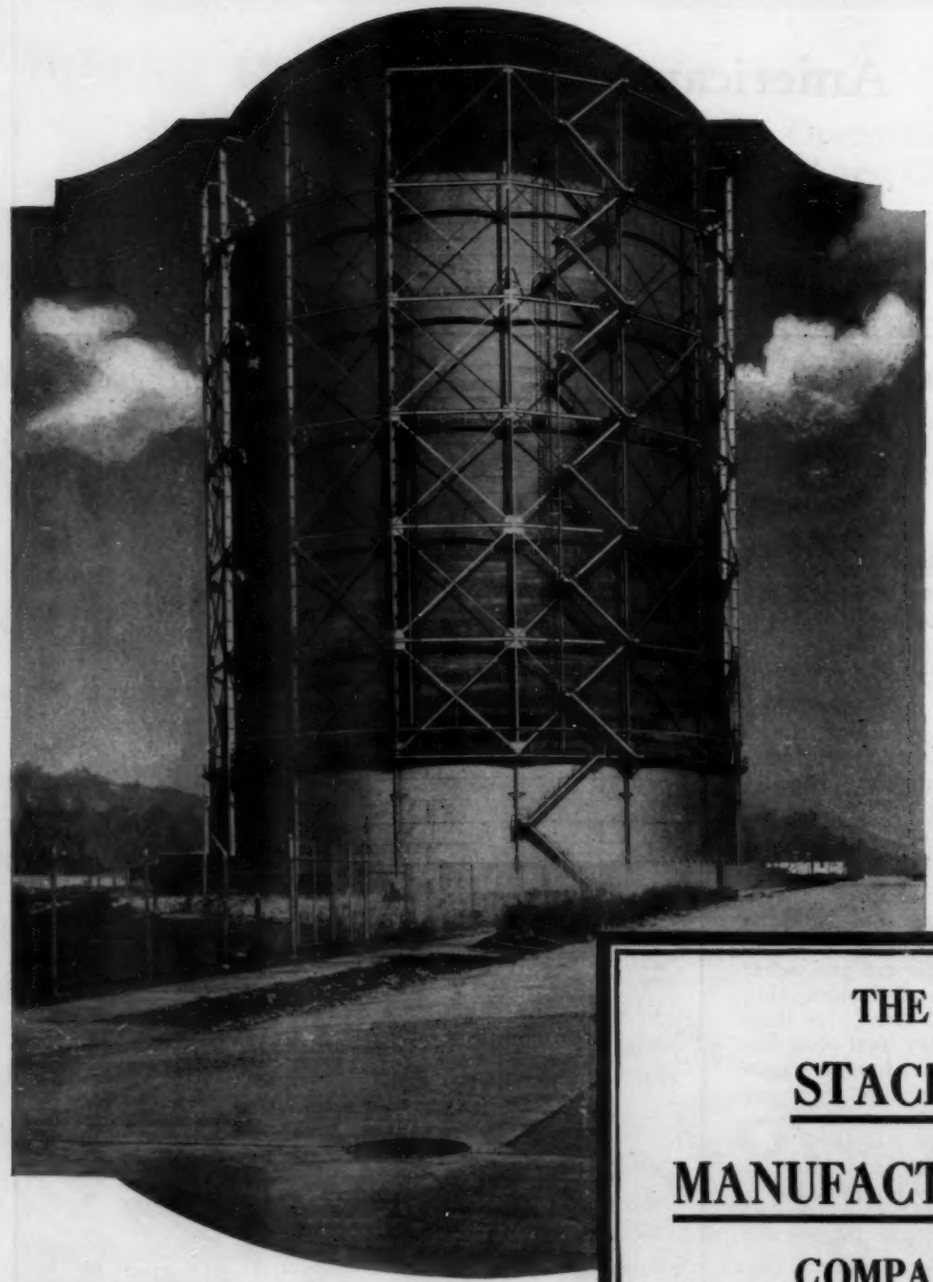
Trade News 86

Trade Catalogs 90

AMERICAN GAS JOURNAL, February, 1928. Vol. 128. No. 2. Published Monthly by American Gas Light Journal, Inc., New York, N. Y. Entered as second-class matter, January 1, 1917, at the post-office of New York, N. Y., under the Act of March 3, 1879.

Subscription $2.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada $3.00; foreign $4.00. Single copies 25 cents.

INDEX TO ADVERTISERS, PAGE 125



3,000,000 Cu. Ft. 5 Lift Gas Holder
Built for
The Nassau & Suffolk Lighting Co.,
Long Beach, Long Island

77 Years of Service to the Gas Industry

THE

STACEY

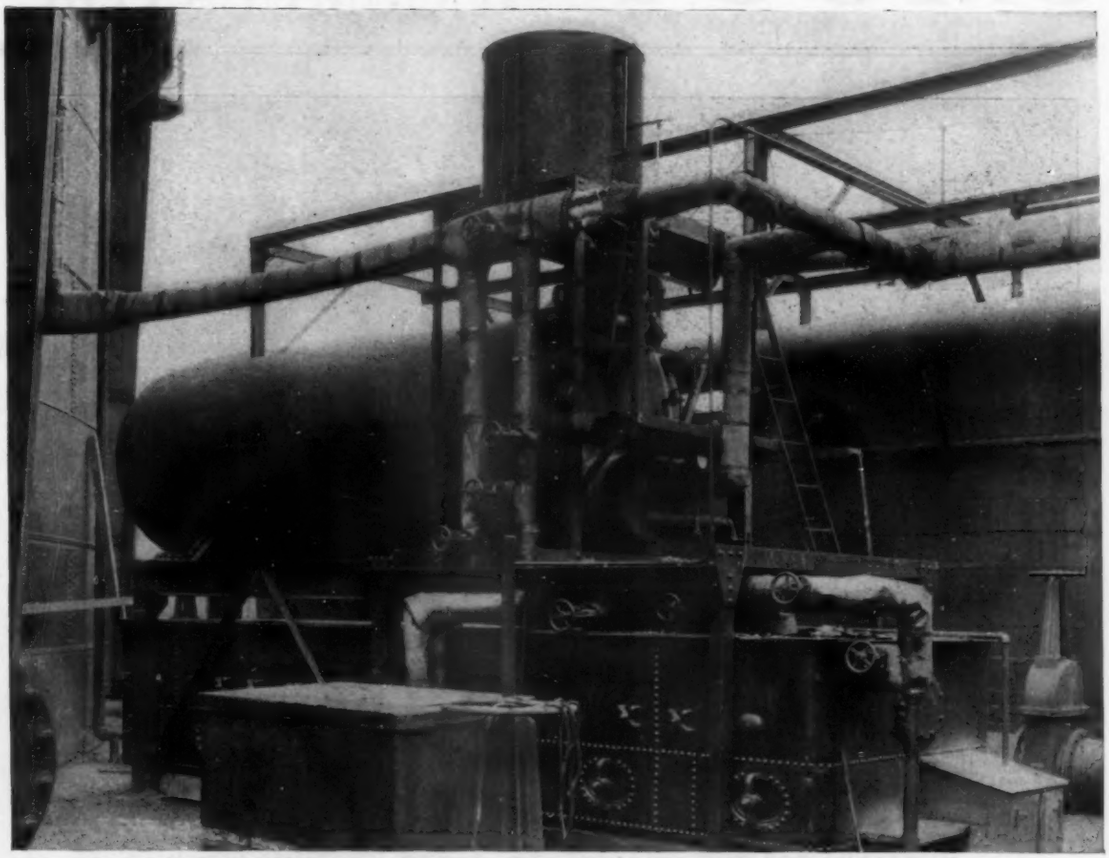
MANUFACTURING

COMPANY

CINCINNATI, OHIO

NEW YORK OFFICE
52 Vanderbilt Ave.

What Do You Do With Tar Emulsion?



Tar emulsion is the black sheep of the water gas plant. It cannot be sold, dumped, stored or given away.

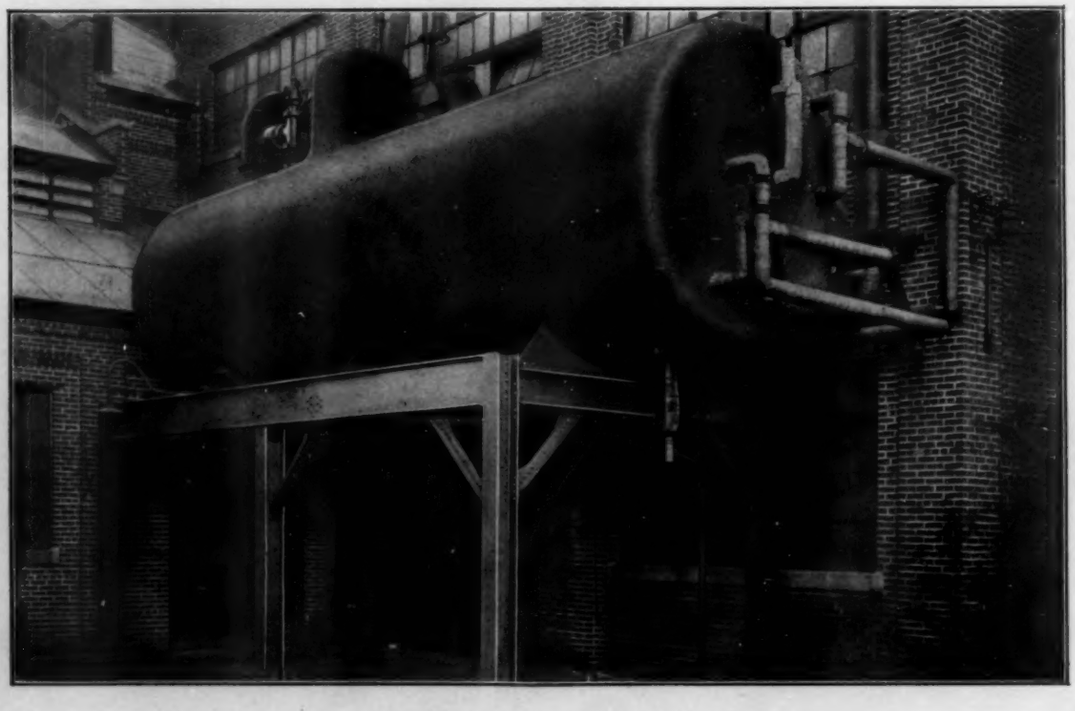
Put emulsion through an R S De-Emulsifier. It will dehydrate your tar to a 3 per cent moisture content and you can sell it or burn it under boilers.

The R S De-Emulsifier consists simply of a pair of tanks, specially equipped for the process, and a mounting structure. It has no moving parts. First cost is low and operation amounts to only a fraction of a cent per gallon of tar.

We have worked out many emulsion problems successfully. We know we can overcome your difficulties also.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

SMOOT STEAM ACCUMULATOR



9′ x 30′ SMOOT STEAM ACCUMULATOR
INSTALLED FOR THE ATLANTIC CITY GAS CO., ATLANTIC CITY, N. J.
OPERATED BY THE C. H. GEIST COMPANY
THE U. G. I. CONTRACTING COMPANY, ENGINEERS

Smoot Steam Accumulators have been installed by the following plants of the C. H. Geist Company:

Atlantic City Gas Co., Atlantic City, New Jersey
Wilmington Gas Co., Wilmington, Delaware
Peoples Gas Co., Glassboro, New Jersey

SMOOT ENGINEERING CORPORATION
136 Liberty Street New York

SMOOT CONTROL

WE ARE NOW READY TO OFFER

THE U. G. I.
MECHANICAL GENERATOR

SELF-CHARGING AND AUTOMATICALLY OPERATED

After building, operating and thoroughly testing our mechanical generator, of 4,000,000 c. f. daily capacity under varying conditions and fuels for three years in U. G. I. plants and satisfying ourselves that it met the U. G. I. standards of operation, efficiency and dependability, we now offer to the gas industry a REAL AUTOMATICALLY OPERATED MECHANICAL GENERATOR.

THE U. G. I. MECHANICAL GENERATOR

HAS THE FOLLOWING ADVANTAGES:

IT IS MECHANICALLY CORRECT
IT WILL SUCCESSFULLY HANDLE VARIOUS FUELS—
EFFICIENTLY AND ECONOMICALLY
IT ELIMINATES SIDE-WALL CLINKER
IT IS A REAL SELF-CLINKERING GENERATOR, EASILY AND
COMPLETELY DISCHARGING ASHES AND CLINKERS
IT PRODUCES STEAM FOR SET OPERATION WITHOUT
INCREASING GENERATOR FUEL OVER HAND CLINKERED SETS
IT OPERATES WITHOUT MANUAL LABOR FOR
COALING, CLINKERING OR BARRING DOWN
IT OPERATES CONTINUOUSLY
IT ELIMINATES LINING REPAIRS IN THE HOTTER
ZONE OF THE GENERATOR
IT WILL EARN ITS OWN WAY

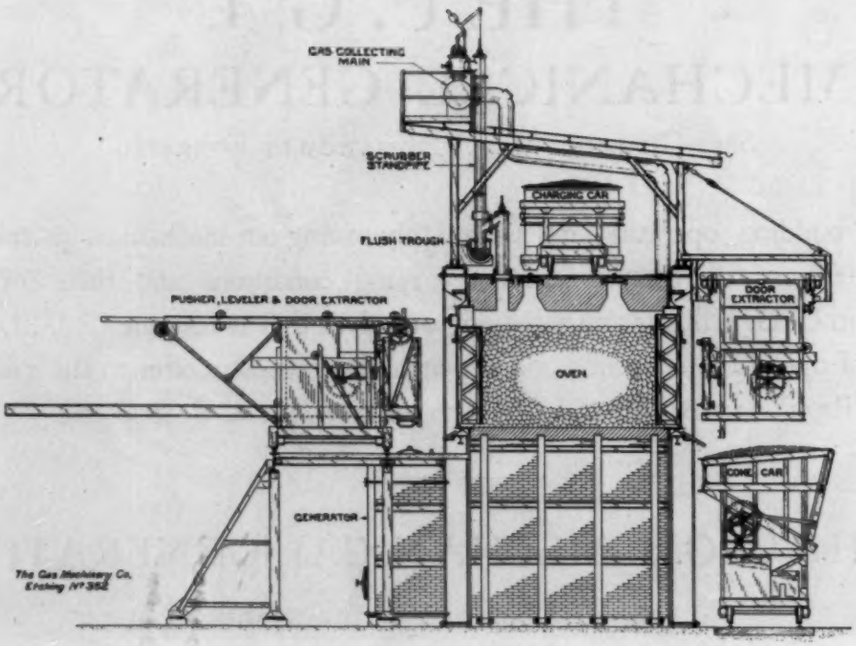
THE U. G. I. CONTRACTING COMPANY

Broad & Arch Sts., Philadelphia

421 Peoples Gas Bldg., Chicago **1419 Healey Bldg., Atlanta**

BY-PRODUCT GAS OVENS

Producers Separate or Attached



Coke Discharging Side of Oven Battery.

THE GAS MACHINERY COMPANY
CLEVELAND, OHIO

A New Booklet on a New Subject

THIS 32-page booklet, not only describes and illustrates the Sulzer System, but is a valuable treatise on the subject of coke quenching. It is replete with data and interesting information on the results secured in existing dry quenching plants.

A copy will be sent upon request.

THE Sulzer System for Dry Quenching coke is simple and dependable. The hot coke is charged into a sealed quenching chamber. Inert gases are circulated in a closed cycle by means of a fan, first through the hot coke mass where they absorb the sensible heat of the glowing coke, and thence through a steam boiler where the gases transfer their heat to the water in the boiler circulatory system and convert it into steam. Literature describing the Sulzer System will be sent upon request.

Dry Quenching Equipment Corporation

INTERNATIONAL COMBUSTION BUILDING

200 MADISON AVE. NEW YORK — N.Y.

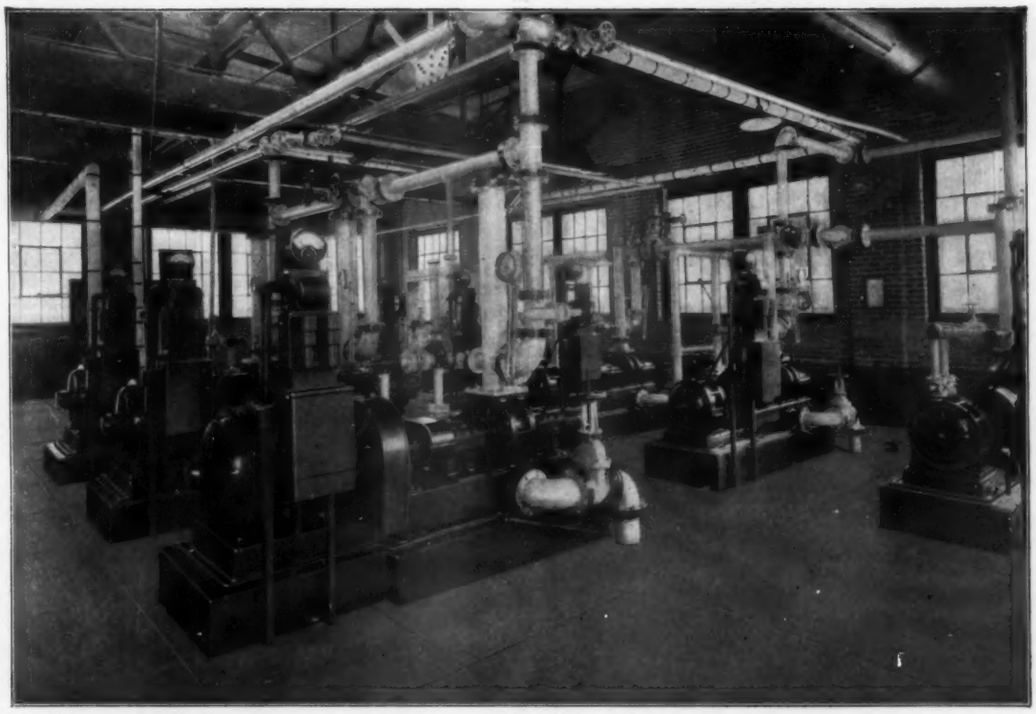
A SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

Gasholders
Condensers
Purifiers
Scrubbers
Tanks
Pipes
Stacks—Flues
Steel Plate Work

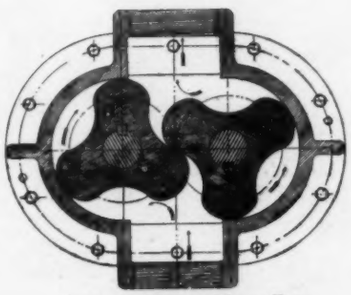
CRUSE-KEMPER COMPANY

AMBLER, PENNA.

Western Union Code, Cable Address: Cruskemper, Ambler



Moving By-Product Liquors in Coke and Gas Plants



Section Through Impellers of Cycloidal Pump.

The positive discharge and the simple sturdy design of Connersville Cycloidal Pumps fit them particularly well to the handling of tar, ammonia liquors, benzol, and other by-product liquors of the gas and coke plants.

Two impellers mounted on large shafts which are supported by ample bearings are the only moving parts. No valves to stick, no ports to clog or springs to break. In other words, a pump just suited to the more viscous liquids.

Send for Bulletin 19E

The Connersville Blower Company

12th St. and Columbia Ave.
Connersville, Indiana

NEW YORK 114 Liberty St. | CHICAGO 623 Monadnock Block | PITTSBURGH 604 Chamber of Commerce

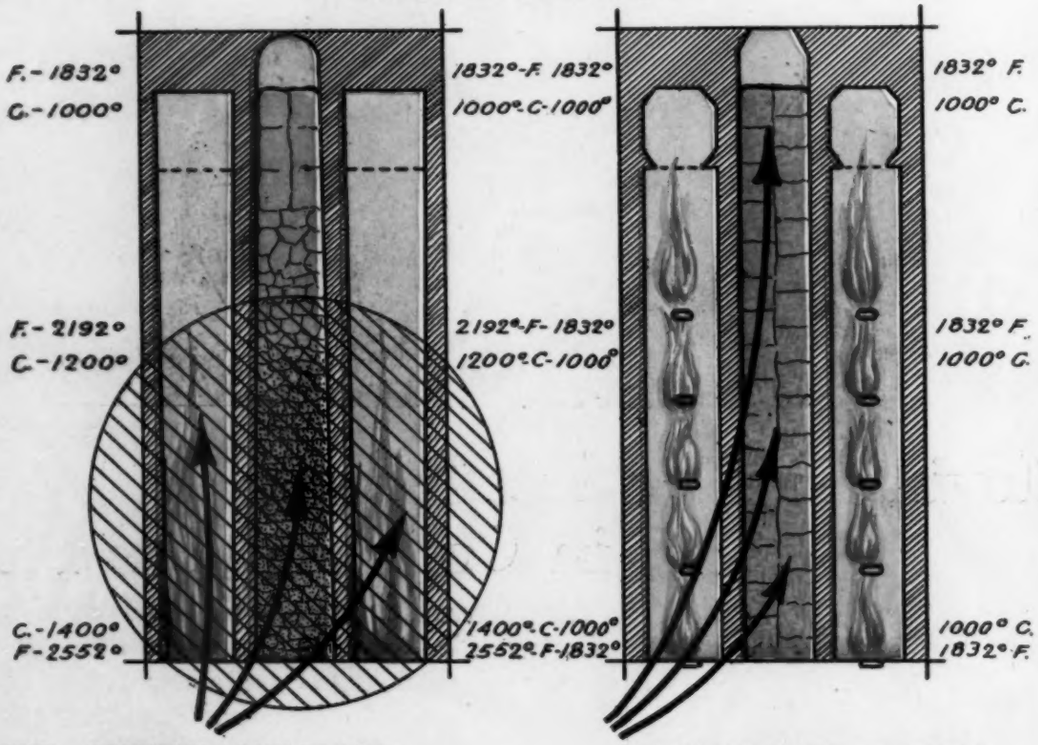
CONNERSVILLE

Blowers • Gas Pumps • Meters • Cycloidal Pumps

THE PROOF!

Showing the Efficiency of the STILL SYSTEM of MULTI-STAGE COMBUSTION

The demonstration plant, as indicated below, has been in operation for the past six months and is 19 feet 8 inches high



THE COMMON ONE-FLAME METHOD

Note how combustion is practically limited to lower 5′ to 6′ 6″, and only occasional tips of flame reach 7′ 6″.

—and then—

THE CARL STILL MULTI-STAGE COMBUSTION SYSTEM

Note how in the Still System the heating gas is stretched over the entire height of the heating flue—19′ 8″.

Furthermore—A 40% throttling of the volume of heating gas did not in the least affect the uniformity of the Still System, while the one-flame process was confined to parts in the immediate vicinity of the sole of the flue.

Other strong points of the Still System are:
Excessive Heating eliminated. Utmost protection of Distillation Gases. Highest yield in By-products, and Free Flowing Tar. Fastest operation of ovens and largest possible thruput. Lowest consumption of fuel gas. Unlimited oven height. Maximum safety and minimum labor requirements in operation. Greatest efficiency.

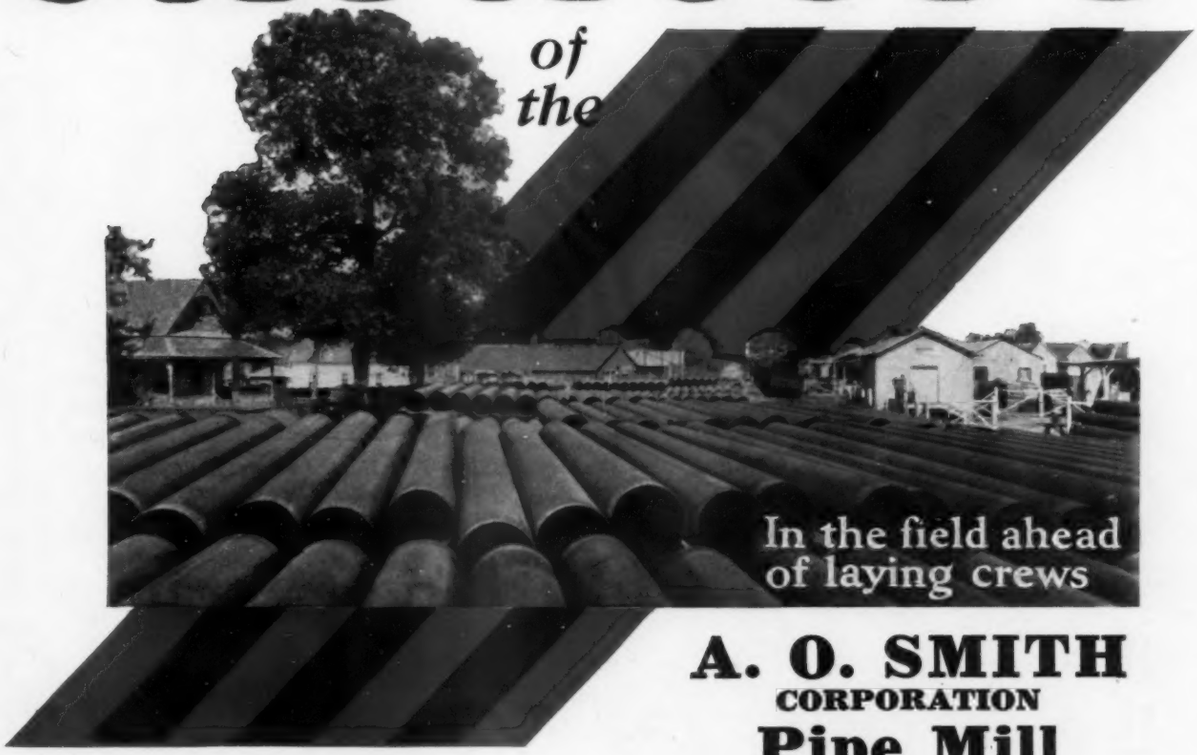
Let our Consulting Engineers give further details

CARL STILL CORPORATION

114 LIBERTY STREET, NEW YORK

CAPACITY

of the



A. O. SMITH
CORPORATION
Pipe Mill

has been INCREASED from 4½ to

6 *to* 8 Miles Per Day

according to diameter—

16 to 24 Inch

SMITHSTEEL
GAS LINE PIPE

A. O. SMITH CORPORATION
Oil & Gas Field Products Division
General Offices—Milwaukee, Wis.
District Offices at Pittsburgh, Tulsa, Dallas, Los Angeles

Mueller Iron-Body, Brass-Plug Service Stop, G-11080

Mueller Flat Head, Iron Body, Brass-Plug Service Stop, G-11100

Overcoming Installation Strain

THE need of gas stops to withstand HEAVY INSTALLATION STRAIN was long ago recognized and provided for by Mueller Co.—pioneers in producing and recommending iron body stops to the gas industry.

For more than twenty years Mueller Stops (as illustrated above) have been giving extraordinary service. Their steady gain in use is proof that the galvanized iron body brass plug stops made by Mueller Co. are filling a positive need.

Mueller Iron Body Stops have extra heavy wall construction. The severe strains of installing cannot distort or twist them. The metal is distributed to provide strength where needed.

The bodies are of the best gray iron, free from sand holes. They are galvanized by the hot process under a high temperature, giving the stops a long-wearing, rustproof coating.

The keys and washers are made of Mueller red brass, known throughout the gas field for its durability. The latest improved methods are used in coring, moulding and machining.

Mueller Gas Service Stops G-11080 and G-11100 (above) are but two of the numerous styles furnished by Mueller Co.

Write for complete Mueller catalog of gas service goods, meeting every requirement of the industry.

MUELLER CO. (*Established* 1857) **Decatur, Ill.**

Branches: New York, Dallas, San Francisco, Los Angeles

Canadian Factory: MUELLER, Limited, Sarnia

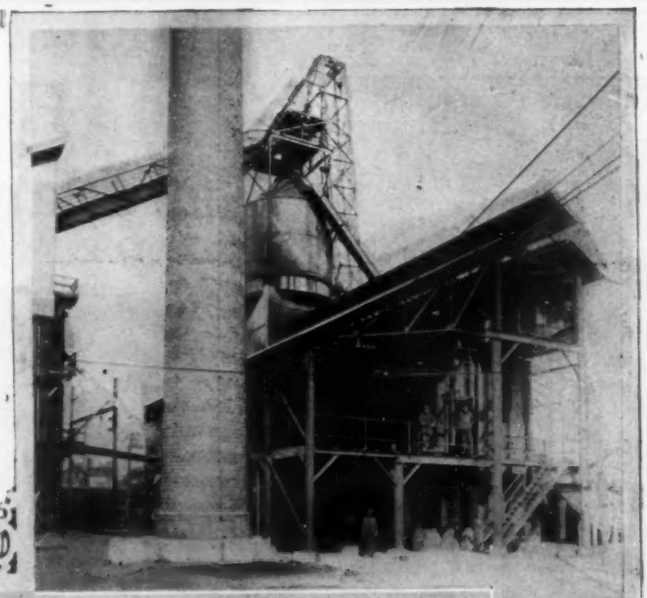
MUELLER

"IECO"

Modern Coal Carbonizing Plants

"Three-Section" Type Ovens for the Large & Medium Size Plants

"Unit" Type Ovens for the Smaller Plants.

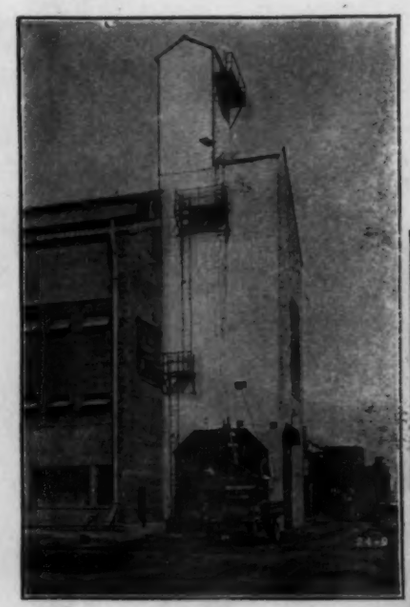


The best there is in
STOP-END BENCHES
and
the most modern and efficient
to be had in
THROUGH BENCHES

Coal gas benches and horizontal gas ovens of "IECO" design and construction are today operating in some of the largest and some of the smallest gas plants in the United States.

THE IMPROVED EQUIPMENT COMPANY, 24 State St., New York

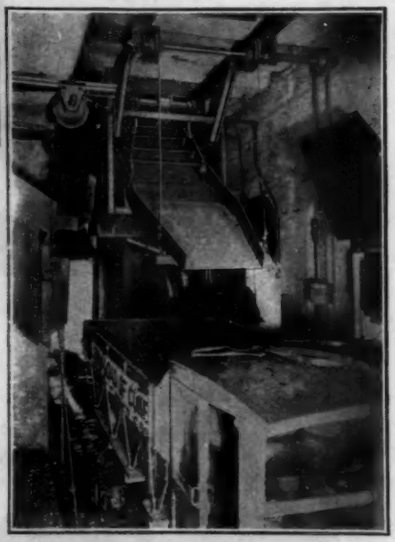
HUNT
Gas Plant Equipment



This all-concrete structure enclosing skip hoist and including cut-off gates, swiveling chutes (adaptable to any position for loading both railroad cars and wagons and weigh larry;—this latter lined with maplewood to protect metal from abrasive action of coke—was designed and built by the C. W. Hunt Co., Inc.

Coal is elevated by a Hunt Pivoted Bucket Conveyor and discharged through a chute into tank shown at the right from which it is loaded into Hunt Industrial Cars and taken to storage bins.

Industrial Railways,
Switches,
Motor Operated and Push Cars,
Automatic Railways,
Conveyors,
Mitchell Electric Vibrating Screen,
Skip Hoists,
Bin and Hopper Gates,
Weigh Larries,
"Stevedore" Manila Transmission and Hoisting Rope and Drilling Cable,
Hunt Rope Couplings,
Coke Reclamation Plants,
Hoisting Equipment,
Also Coal Crackers.



Showing one of a battery of twelve Mitchell Electric Vibrating Screens suspended from structural iron work, under coke storage bins, delivering direct to truck.

We are confident Hunt Gas Plant Equipment will render many years of dependable, economical service, for every detail in design, workmanship and material has had the care and supervision of experts with over half a century of experience to guide them.

Hunt Engineers will gladly help in the selection of equipment most suitable for your peculiar requirements. Write them at any time, but today is a good time.

C. W. HUNT COMPANY, Inc.

West New Brighton, Staten Island, New York

PHILLIPS LANG & CO., Inc.
431 S. Dearborn St., Chicago, Ill.

ENGINEERING EQUIPMENT CO., Ltd.,
358 Beaver Hall Square, Montreal.

ERNEST F. LEARNED
141 Milk St., Boston 9, Mass.

ANNOUNCING THE FORMATION OF

UNITED ENGINEERS & CONSTRUCTORS INC.

DWIGHT P ROBINSON. PRESIDENT

COMBINING

THE U. G. I. CONTRACTING COMPANY
OF PHILADELPHIA

PUBLIC SERVICE PRODUCTION COMPANY
OF NEWARK

DWIGHT P. ROBINSON & COMPANY, INC.
OF NEW YORK

DAY & ZIMMERMANN
ENGINEERING & CONSTRUCTION COMPANY
OF PHILADELPHIA

THE COMPANY THUS FORMED, WITH A BACKGROUND OF OVER FORTY-FIVE YEARS OF SUCCESSFUL WORK, WILL OPERATE IN ANY PART OF THE WORLD UNDER BROAD POWERS PERMITTING PARTICIPATION IN EVERY FORM OF ENGINEERING AND CONSTRUCTION ACTIVITY.

PRINCIPAL OFFICE—PHILADELPHIA
N. W. COR. BROAD AND ARCH STREETS

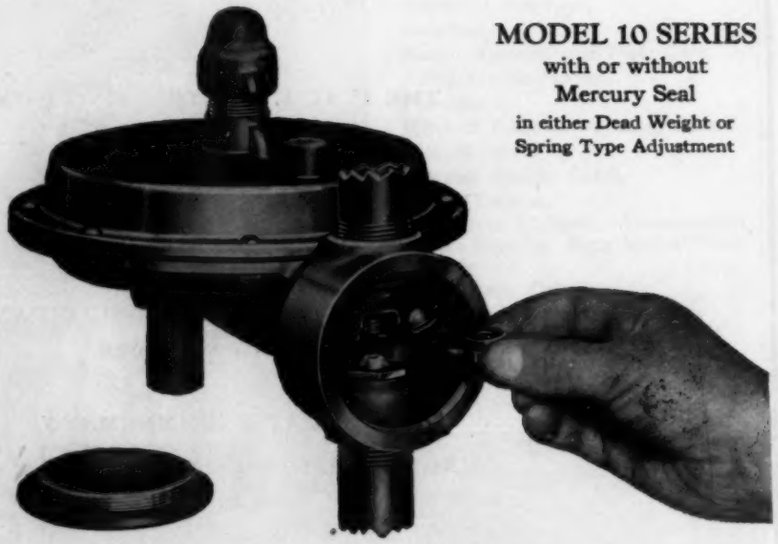
NEW YORK, NEWARK, CHICAGO, LOS ANGELES, ATLANTA, PITTSBURGH,
HOUSTON, MONTREAL, RIO DE JANEIRO, BUENOS AIRES

THE LATEST ACHIEVEMENT OF OUR ENGINEERING DEPARTMENT

ALL WORKING PARTS ACCESSIBLE *and* INTERCHANGEABLE *while in Pipe Line*

An Announcement
of intense interest to the Gas Industry will be made in next month's trade papers.

—An entirely new Reynolds Product that will satisfy engineers, please purchasing agents and lower service costs. Advance information will be sent on request.



MODEL 10 SERIES
with or without
Mercury Seal
in either Dead Weight or
Spring Type Adjustment

Reynolds Products

for all kinds of Pressure Reduction—for either artificial or natural gas.

Governors—
Intermediate Pressure
Triple Outlet
Holder
Toggle Type Street

Regulators—
High Pressure Service
Low Pressure Service
Intermediate Pressure
High Pressure Line
Single and Double District Station

Valve—
Automatic Quick-Closing Anti-Vacuum

YOU can save many hours of productive labor, speed up installation time, cut installation costs and realize new and better performance with the Reynolds Model 10 Series. Every working part in the Model 10 may be removed while in the pipe line and every working part is so accurately made that it is always interchangeable.

Reynolds
Gas Regulator Company
Anderson, Indiana
Established 1892

Representatives:
EASTERN SERVICE COMPANY, BOSTON, MASS.
F. E. NEWBERRY, AVON, NEW JERSEY
THOS. C. CORIN, DETROIT, MICHIGAN

GLOVER-WEST *Vertical Retorts*

A
28 DAY TEST

A SUBCOMMITTEE of the Carbonization Section of the American Gas Association completed for the 1927 Convention a series of plant tests inaugurated in 1926. Full particulars can be seen in the Carbonization Committee reports for these two years, and should be studied by all contemplating plant extensions.

The Glover-West plant at Stamford, Conn., was tested in 1927. See:

CARBONIZATION COMMITTEE—APPENDIX 1
REPORT OF 1927 SUBCOMMITTEE ON PLANT TESTS
Heat and Material Balance on the Glover-West Continuous Vertical Retorts of the Stamford Gas and Electric Company, Stamford, Conn.

The heating arrangements of Glover-West benches with their control facilities, and the ease with which the speed of coal through the retorts can be adjusted, enables operators to get the maximum yields possible from any coal used, without disturbing labor time schedules or sacrificing efficient fuel results.

WEST GAS IMPROVEMENT CO.
Builders of Coal Gas Plants
441 Lexington Ave. New York.

"Pyro is the best we have ever used on account of its extreme handiness and instantaneous direct readings. Besides — we now can immediately tell what temperature the work has obtained while stationary instruments only indicate the heat of the furnace itself."

Your chance to try this instrument in your own plant—

This is the handy Pyro that enables you to get direct and instantaneous temperature readings and makes it possible to determine the temperature that the work has obtained at any given instant, at any stage of the process.

You can stop the waste of fuel and maintain a more uniform quality than ever before.

It will help you do a better job! So by all means take advantage of this opportunity to try the handy Pyro in your plant before purchasing.

Any one can use it. No calculations—no chance for mistakes in judgment. Simply look through it at the work—as you would with a telescope. Press the button. The indicator instantly points the temperature and holds it until released by pressing the same button.

Handy? It weighs only 25 ounces, is just 7 inches long. Over 6,000 are in daily use.

A note on your regular business letterhead will do, and you can try the instrument for two full weeks. If at the end of that time you are not so enthusiastic that you will not part with it, you can return it and there will be no charge.

TRY IT OUT IN YOUR OWN PLANT

Pyrometer Instrument Co., 74 Reade St., New York

Pyro

Radiation Pyrometer

2414

DRESSER COUPLINGS *Dominate!*

As used on METER CONNECTIONS

Here is shown a battery of meters connected up with Dresser couplings. This particular installation was made by Kansas City Gas Company, Kansas City, Missouri. It emphasizes the fact that the use of Dresser couplings is not confined to high pressure pipe lines. They can be most effectively used wherever absolutely tight and flexible joints are essential.

S. R. Dresser Manufacturing Company, Bradford, Penna.

The BARTLETT HAYWARD CO.

Engineers and Founders

BALTIMORE and NEW YORK

DESIGNERS AND BUILDERS OF:

Carburetted Water Gas Plants
Complete Coal Gas Plants
By-Products Plants
Salt Water and Fresh Water Condensers
De Brouwer Charging and Discharging Machines
Purifiers - Steel Tanks - Shaving Scrubbers
Vertical Waste Heat Boilers
Gas Holders

View of Main Plant, Located at Baltimore

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900.

HENRY M. RILEY, *Editor*

The Call to the Colors

THERE is nothing far-fetched or outlandish anent the gas range's venture into the realm of color. On every hand there is abundant evidence that the American public is just entering an era wherein increasing attention is being given to the artistic. Industrial plants are no longer dull and drab limbos of dinginess and haphazard arrangement; business offices have sloughed their former cold and uninviting appearance; men past fifty have ceased dressing in attire that is at once an admission that they are growing elderly apace, and, perhaps, beginning to view life through smoked glasses. There is a demand for things sensibly artistic; there is a call to the colors.

IN LINE with the worth-while efforts that are being made to render the home more livable and more pleasing to the eye the kitchen is at last coming into its own. Accordingly, it would seem that the application of color to the gas range is an entirely logical step. Indeed, it is somewhat surprising that the housewife did not demand this innovation on her own initiative. Howbeit, the departure from the former hospital-like appearance of this appliance constitutes the last needed touch to the end that the kitchen can be definitely termed one hundred per cent artistic.

BUT aside from the matter of desired additional decoration the colored gas range bids fair to bolster and augment the domestic cooking load. In this connection it will go a long way toward bringing the housewife back into the kitchen, into the main workshop of the home, with its efficient equipment and pleasant atmosphere. Since motor cars and many other items of luxury and necessity are purchased with an eye for the artistic it is reasonable to assume that the colored range will stimulate the sale of cooking appliances at regular intervals and thereby get obsolete kitchen equipment off the gas companies lines.

IF GAS ranges in colors strike a note of popular favor it will be necessary for gas companies to keep fully informed as to the proper color schemes for various types of kitchens. The customer will more and more call upon them for advice in this connection. Consequently the Home Service or other department which will handle such matters must perforce be in a position to advise intelligently. There must be no guess work with its attendant incongruity of color arrangement. Indeed, the proper functioning of the gas company in this regard might be vital in determining the success of the colored gas range.

Higher Gas Yields Offset Lower By-Product Prices

IF the market price of ammonium sulphate decreases one cent per pound the cost of coal-gas manufacture increases from two to four cents per M, the exact amount depending upon the carbonization system used. If the price of tar increases by one cent per gallon the cost of coal-gas manufacture is decreased by approximately one cent per M. If the market price of motor benzol increases by four cents a gallon this gives from one to two cents per M reduction in the net cost of by-product gas manufacture where light-oil recovery is practiced.

Some of these relationships have only recently been fully appreciated by the gas man, but with the appreciation of the importance of such by-product price changes has come increased attention to markets for these commodities and to the trends in their production and sale. Hence there has been, during the past year especially, renewed interest in the interlocking of the gas and coke industries with the chemical engineering industries which use these other products of coal processing.

The most serious factor to be noted in this general field has been the downward trend in the market price for ammonium sulphate, which now appears to have settled more or less definitely at about two cents per pound f.o.b. producers' works. Unfortunately there is no evidence that there is likely to be any increase in this price, because this by-product finds itself permanently in direct competition with both Chilean nitrate for fertilizer use and with direct synthetic ammonia made by chemical plants for the refrigeration, explosives and chemical markets. From now on those who are considering coal-gas costs will do well to estimate on credits from ammonia sales at no greater price than this.

Offsetting this downward trend in ammonia prices there has been an encouraging upward trend in the market price for both tar and light oil, and the problem of marketing coke breeze has been reduced because a large number of producers are now themselves using this material efficiently for fuel. But the big offsetting advantage which is saving the industry from increased net holder cost for coal gas is the fact that the surplus gas available for sale per ton of coal carbonized has increased steadily.

Thus the industry by improved production technique has met what otherwise might have been a more serious situation. This increase in production efficiency has, indeed, been sufficient to permit a marked increase in the interest shown by the gas industry for new gas-retort and oven plants. Despite some shrinkage in by-product income, there has been, therefore, no curtailment of the trend toward installation of coal-processing equipment for base-load city gas making.

Gas Generator Capacity Determines Fuel Choice

RECENTLY one of the mid-western gas companies which is fortunate in having an extremely capable operating engineer as manager found some unusually interesting relations between coke and coal for water-gas generator fuel. One of the coal companies offered it small-size coal at a very reasonable figure and careful tests were made on the generator performance of this fuel. It was found that excellent efficiencies could be had, but unfortunately a dense fuel bed formed and the maximum make from the machines was materially reduced.

Under certain conditions other than those prevailing in this plant it might have been profitable to forego large machine capacity in order to obtain lower fuel cost per M. In this plant, however, very favorable coke prices prevail, and figuring the test results on the basis of cents per M it was found that the coke was distinctly the more economical fuel to use.

It is not at all safe to generalize from this series of experiments that coke is always superior to coal. The important general conclusion to be drawn is that of considering all factors. A preliminary comparison in the case cited, neglecting only the maximum generator capacity, would have shown a conclusion exactly the reverse of that finally properly drawn when this one consideration was added and given proper weight.

Far too often a local management, under the spell of effective salesmanship, accepts a new proposition for equipment, fuel, or operating method without due consideration of every factor. It pays to think the proposition through and to give careful attention to every consideration before making a decision in such matters. Only when the very last factor which deserves attention has been added can one safely determine which way the decision turns.

An Enlightening Bulletin

THE Statistical Bulletin No. 5, recently issued by the American Gas Association, presents a striking picture of the growth of the gas industry and is worthy of careful perusal and study on the part of every gas man interested in keeping himself posted as to the status of the business in which he is engaged.

This bulletin, which deals for the most part with financial statistics, can but impress one with the fact that the gas industry is in splendid condition. Furthermore, the data and figures contained therein have been published only after careful research and, as a consequence, constitute the latest and most accurate word on the subject. They can be accepted as entirely authoritative.

The A. G. A. Statistical Bulletin No. 5, containing figures and data on the financial aspect of the industry, which were derived directly from the gas companies, shows that the scope and responsibilities of the industry are a great deal larger than indicated by the compilations as presented in our January issue.

We are glad to commend these newer figures contained in the A. G. A. Bulletin No. 5 to our readers.

Genuine Competition Asked For New Utility Financing

CERTAIN public utility commissioners have recently expressed important opinions regarding the present system used in the issue of bonds and stocks of utility companies. These officials take the position that the individual utility company or utility holding company may not rightly secure money through financing managed by some preferred bond or banking house. Whether one agrees with such theory or not the idea is suggestive of thought and is a subject worthy of careful consideration by gas-company executives.

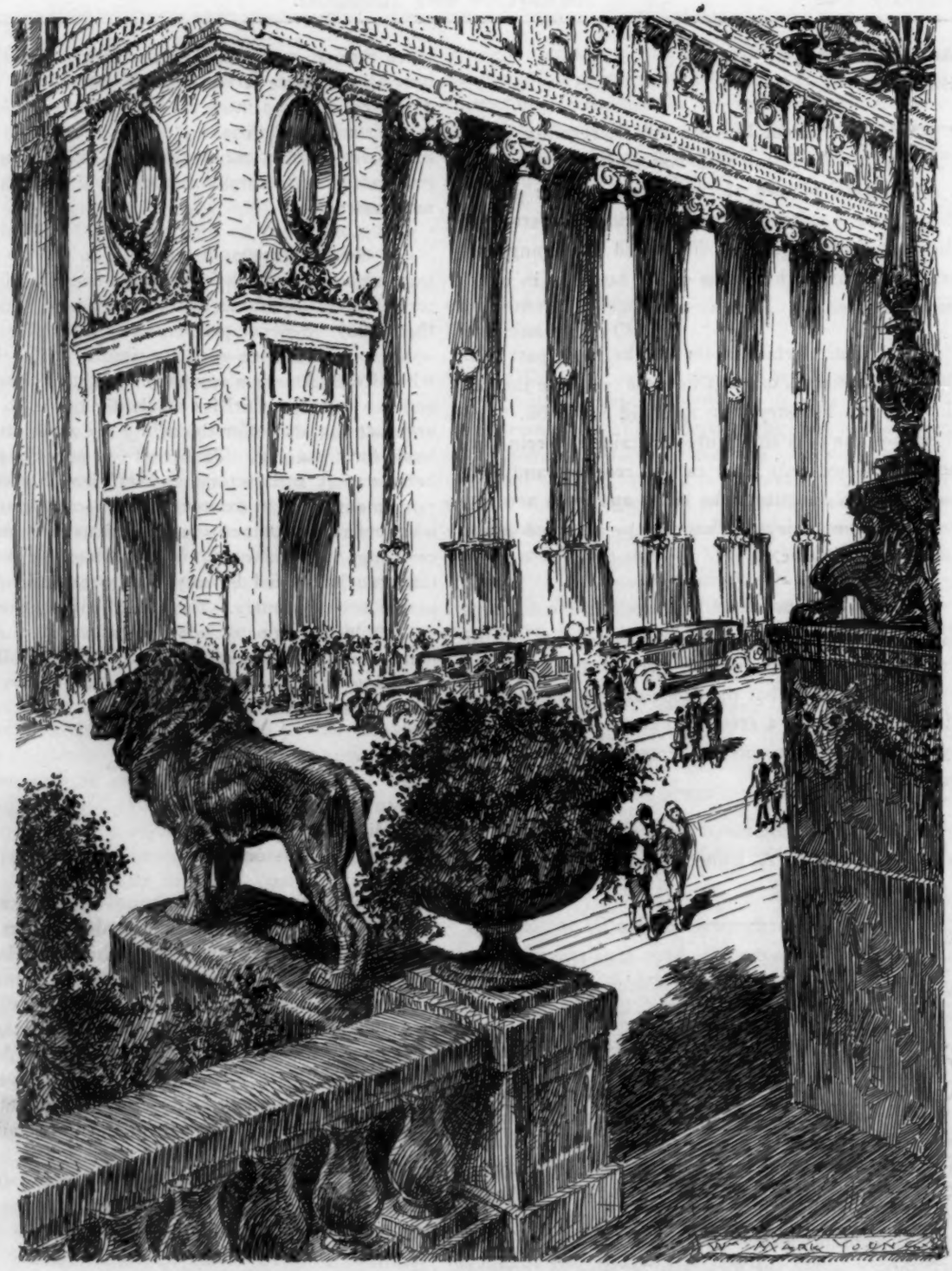
It is just as important for a utility to secure its money at the lowest possible cost as it is to buy the coal or oil at the most favorable figure. This does not always mean taking the cheapest service any more than it means taking the cheapest coal. The over-all ultimate cost depends upon the service rendered quite as much as upon the fee paid. But in the case of both coal and bonds there is no excuse for dealing with a company solely because one likes its president or thinks the color of its stationery most attractive.

Gas-company managements will do well to discuss this problem with their banking friends who have served them satisfactorily in the past in order that there may be developed a proper and effective cooperation in future security issues. The banker who already knows a company's business thoroughly and can sell its securities efficiently ought to be the one that can also offer the utility the most attractive basis for financing. Thus there is every reason to believe that satisfactory and efficient banking arrangements now in existence may be continued even when sharply competitive conditions are arranged covering future issues. The problem is not one that can be solved by any single method applying to the entire country. Each local management and each holding-company board must study the problem carefully and make certain that it is handling its financing both for the best of the public served and in the interest of its stockholders.

Splendid Cooperation Afforded Gas Association

THE success of any technical or trade association rests with the individual members. The effectiveness of the work which can be done depends upon the extent to which such members will give of their time, thought and energy to the planning and carrying out of important committee work. In these respects the American Gas Association is exceedingly fortunate. It has deserved, and regularly secures, unstinted support from its membership. The recent meeting of the important Carbonization Committee of the Association is but one of many examples. On that occasion approximately forty capable and busy men gathered at the Association headquarters to give an entire day to serious discussion and planning of the committee work. Many more days will be generously devoted to the carrying out of the projects thus started.

One participating in such activities gains more than he gives, but in many industries this is not appreciated. The Gas Association and the gas industry are to be congratulated that there is such a fine spirit of association cooperation evident.



An Example of the Gas Industry's Contribution to Better American Architecture. The Peoples Gas Light and Coke Company Building

The Effect on Combustion and Efficiency of Replacing the Grid of an Open-Top Gas Range With an Attachable Solid Top

By J. H. Eiseman

Associate Gas Engineer, Bureau of Standards

THE following article is a summary of the more important results obtained from a comparison of the completeness of combustion and thermal efficiency obtained with attachable solid and grid top gas ranges. The observations reported were made during a period of several years and in some cases were incidental to other work. A number of investigators have helped in the collection of data. Acknowledgment is hereby given to G. B. Shawn, Russel Heywood, Oscar Tow and G. H. Cash of the American Gas Association Testing Laboratory, and S. A. Guerrieri of the Bureau of Standards for their assistance in this connection.

Until recent years nearly all ranges used with manufactured gas have been of the open or grid top variety. Recently, however, the solid top range was introduced and has gained wide popularity. The increasing demand for the solid top has led to the manufacture not only of permanent solid top ranges but also of a number of separate solid tops which are so constructed that they can be put in the place of or rested upon the grids of the grid top range. This offers an easy way to convert a grid top range into a solid top range at a very small cost. These appliances are usually sold from house to house by agents. Some of the claims made for them by their distributors are given below.

Claims Made for Attachable Solid Top

It is claimed (1) that they reduce the gas bill; (2) that they are safe and produce no carbon monoxide; (3) that they are easily cleaned; (4) that the food will not burn; (5) that they double the cooking capacity; (6) that they apply an intense heat; (7) that flames are protected from drafts of air; (8) that cooking utensils are protected and prevented from tipping; (9) that from two to four articles can be cooked with one burner; and (10) that burners are kept clean and prevented from clogging.

This bureau has received requests for advice from a number of users of these tops who complain of irritating odors noticed when the tops were being used. In several cases ill health has been attributed to conditions resulting from the use of these attachments. Irritating odors from gas stoves usually indicate the presence of aldehydes which are formed when combustion is incomplete, and under such conditions carbon monoxide is always present. This odorless gas is capable of causing headaches, nausea, and even death.

It was therefore felt that, in the interests of the public health, an investigation of this type of appliance was warranted. Of the number of claims stated above, the paper deals only with the questions which we feel to be the most important, that is, the effect of the attachable top on combustion, and a comparison of the relative efficiencies obtained when using the attachable solid and the grid tops. It is recognized that there are on the market ranges designed and built with solid tops which are both safe and efficient, and it is not to these appliances that this paper refers.

Apparatus Used

The grid top range used in these tests is of a well-known make and one which bears the blue star of the American Gas Association's testing laboratory. This star signifies that the range has successfully met all of the tests required in order to be listed as an approved appliance.[1]

The attachable solid tops used are representative of this type of accessory. The results should, therefore, be a fair indication of what can be expected if an attachable top is used on a grid top range.

A gas meter, a regulator and a pressure gage were installed just ahead of the range. An apparatus for the determination of the ratio of air to gas was connected to the burners and samples of the products of combustion were collected in a sampling hood and analyzed for carbon monoxide and carbon dioxide. A calorimeter was also used for determining the heating value of the gas used. Both the apparatus used for determining carbon monoxide and carbon dioxide and that used for the ratio of air to gas depend for their action upon the thermal conductivity of the gases, the theory of which

Publication approved by the Director of the Bureau of Standards, Department of Commerce, Washington, D. C.

[1] See American Gas Association Gas Range Approval Requirements for 1928.

is described in a publication of the Bureau of Standards.[2]

The apparatus listed above was set up as shown in figure 1 and the four burners adjusted for a normal gas rate, namely, 9,000 B.t.u. per hour for each of the three standard burners, and 12,000 B.t.u. per hour for the giant burner with a gas line pressure of 4½ inches of water, chosen as an approximate average of pressures in this city (Washington).

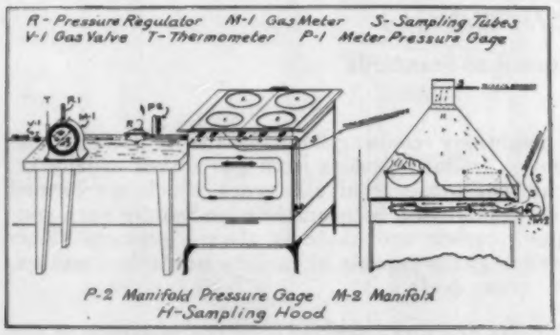

R - Pressure Regulator M-1 Gas Meter S - Sampling Tubes
V-1 Gas Valve T - Thermometer P-1 Meter Pressure Gage
P-2 Manifold Pressure Gage M-2 Manifold
H-Sampling Hood

Fig. 1.—Method of test and assembly for attachable solid tops

With these rates the air shutters were set so that a good primary air adjustment was obtained with each burner. A four-quart aluminum utensil filled with water was then placed above each burner on the grids, and, after allowing sufficient time for a constant condition to be reached, a sample of the products of combustion was drawn from the hood and analyzed. The air-gas ratio was also determined for each burner at the same time. Other gas rates were obtained, without changing the orifice or air shutter settings, by varying the gas line pressure, and samples were taken as before for each rate. The results were plotted as shown by the curve marked "grid top," figure 2. The carbon monoxide was calculated in terms of cubic feet produced per hour and plotted against the gas rate in terms of total B.t.u. per hour for all four burners. From this curve it will be seen that no carbon monoxide was found until a total rate higher than 52,860 B.t.u. per hour was used. This corresponds to a rate of 12,200 B.t.u. per hour for each of the three standard burners and 16,260 B.t.u. per hour for the giant burner. As these rates are much higher than the normal (39,000 B.t.u. per hour), this range, used as it was designed to be used, with the grid top, would not give rise to incomplete combustion under any of the usual working conditions.

Tests Repeated With Solid Top

The utensils were then removed and the grids replaced by the solid top and the same method of test repeated. The results of these tests are shown by the curve marked "Grids Replaced by Solid Top." With the solid top in place an extremely dangerous quantity of carbon monoxide, approximately six cubic feet per hour, was found at the normal rate. Even when a total rate as low as 16,000 B.t.u. per

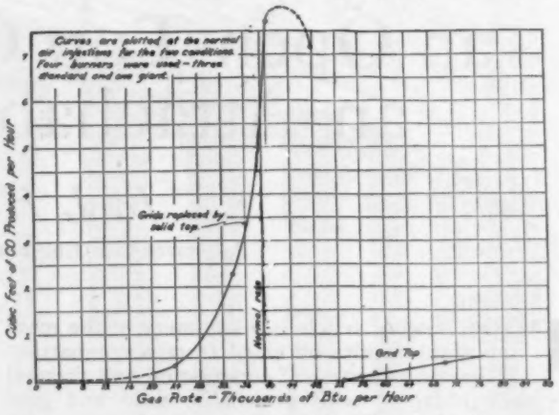

Curves are plotted at the normal air injections for the two conditions. Four burners were used - three standard and one giant.
Grids replaced by solid top
Normal rate
Grid Top
Cubic Feet of CO Produced per Hour
Gas Rate - Thousands of Btu per Hour

Fig. 2.—Effect of replacing the grids of a well designed range by an attachable solid top

hour was used, samples of the products of combustion still showed small amounts of carbon monoxide. The carbon monoxide produced passes through a maximum, as shown on the curve. This is due to the fact that the use of rates higher than about 43,000 B.t.u. per hour increases the volume of the flame to such an extent that some of the gas burns at the edges of the top and the production of carbon monoxide is therefore somewhat decreased. A study of these results clearly indicates the dangerous conditions which may be produced by replacing the grids of a well designed range by an attachable solid top when all four burners are used at the same time.

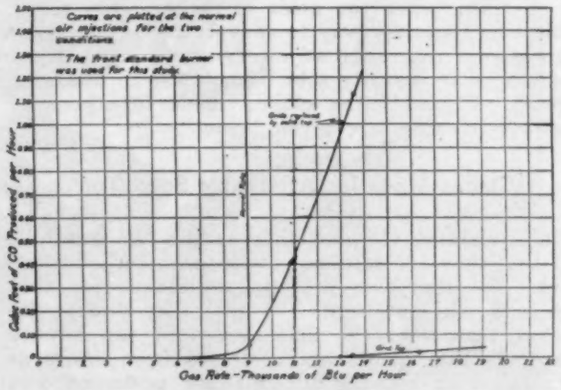

Curves are plotted at the normal air injections for the two conditions.
The front standard burner was used for this study.
Grids replaced by solid top
Normal Rate
Grid Top
Cubic Feet of CO Produced per Hour
Gas Rate - Thousands of Btu per Hour

Fig. 3.—Effect of replacing the grids of a well designed range by an attachable solid top

One of the claims for the attachable top is that a meal can be prepared with only one burner in service. A comparison of the attachable solid and grid tops was therefore made with only one standard burner in use on each.

The results of this series of tests are shown in figure 3. In this case it was again necessary to supply more than 12,200 B.t.u. per hour before any carbon monoxide was found when using the grid top, while the normal rate of 9,000 B.t.u. per hour

[2] Bureau of Standards Technologic Paper No. 249, Thermal-Conductivity Method for the Analysis of Gases, by P. E. Palmer and E. R. Weaver.

produced 0.059 cubic foot of carbon monoxide per hour when the solid top was in place. This corresponds to 0.08 per cent of carbon monoxide (air free), which is above the limits specified by the American Gas Association Testing Laboratory as an allowable amount.

Conditions Necessary for Complete Combustion

Two conditions necessary for combustion to be complete in any type of gas appliance are: (1) A sufficient supply of air, and (2) a ready escape for the combustion products. The air may be obtained in two ways, as "primary" air which is drawn into the burner through the air shutter by the gas stream, or as "secondary" air which is supplied at the point where the gas burns. Gas range burners seldom obtain as primary air more than 50-55 per cent of the total required; hence, in order that the gas may be burned completely it is necessary to

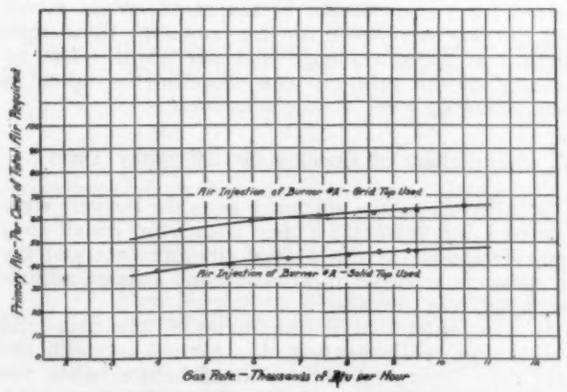

Primary Air—Per Cent of Total Air Required
Air Injection of Burner #8—Grid Top Used
Air Injection of Burner #8—Solid Top Used
Gas Rate—Thousands of Btu per Hour

Fig. 4.—Reduction in air injection caused by use of solid top. No change in burner adjustment

have the range so designed that a good circulation of air is produced around the burner heads. It is also necessary for the combustion products to have a ready escape. If the products do not have a free exit they form a blanket around the burner head and prevent the secondary air from gaining access to the flames.

The two conditions necessary for complete combustion mentioned above are adequately met when the range tested is equipped with the grid top. Each burner has a good primary air injection and a sufficient supply of secondary air. The grids also offer a ready escape for the combustion products from each burner. However, when the grids are replaced by a solid top, conditions are radically altered. The burners on this range are in the usual square formation, two standard burners at the rear and one standard and one giant burner at the front.

Air for Combustion Retarded

When the solid top is in place the only exit for the products of combustion is at the front of the range. The air for combustion, however, must also enter at the front and as it is retarded by the burned products the supply to the burners is considerably reduced and may be contaminated by products of combustion. The primary air is also reduced when the solid top is used because the burners are heated to a higher temperature. This effect is shown in figure 4. The reduction in both primary and secondary air causes the flames to change in appearance as is illustrated by the two drawings, figures 5 and

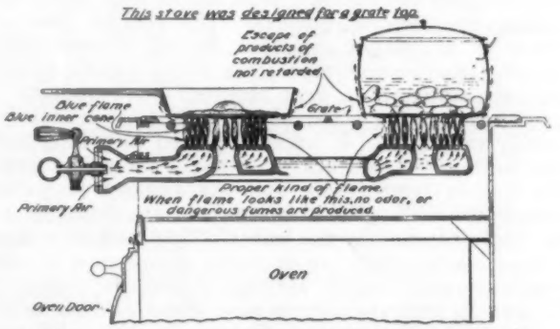

This stove was designed for a grate top
Escape of products of combustion not retarded
Blue flame
Blue inner cone
Primary Air
Grate
Proper Kind of Flame. When flame looks like this, no odor, or dangerous fumes are produced.
Primary Air
Oven
Oven Door

Fig. 5.—Appearance of flames when stove is equipped with a grid top. This represents a safe condition

6. Such a reduction of the air supply causes carbon monoxide to be formed at a rate which may result in a serious hazard to the user of the range.

One manufacturer of an attachable solid top, to whose attention the extremely dangerous character of his product had been called, endeavored to eliminate the hazard by cutting outlets for products of combustion at the back and along the edges of the top. The top so modified was tested repeatedly, the outlets being enlarged after each test. Although this process was carried to such an extent that the top was hardly recognizable as a solid top, and any advantages of appearance, convenience, or protection to the burners it may have originally possessed had been sacrificed, it still adversely affected the aeration of the flame. Its use would render dangerous a grid top stove, which previously was only upon the verge of becoming unsafe.

Method of Efficiency Tests

The working efficiency of a gas range is that obtained over the entire cooking process. It is necessary to determine the efficiency of heat transfer, therefore, not only during the initial stage of the process, when the gas is turned on full, but also

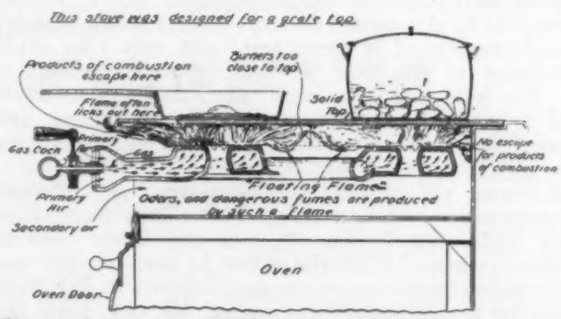


Fig. 6.—Appearance of flames when a stove designed for a grid top is equipped with a solid top. This represents a dangerous condition

that obtained while the process continues at the final cooking temperature with the gas rate reduced; the efficiency under these different conditions will not be the same since the volume of the flame varies greatly.

The essential feature of any efficiency test of a gas range is the measurement of the heat absorbed during the cooking process. The specific heat of water is practically constant for all temperatures ranging from room temperature to the boiling point; and the amount of heat required to evaporate a known amount of water at any temperature may be readily calculated. If water is heated to boiling and the boiling temperature maintained for some time, the rise in temperature and the amount of water evaporated will give a fairly accurate measure of the heat absorbed by the water. This method makes it possible to obtain an accurate comparison of the heat absorption under varying conditions, provided all utensils used are alike in size, shape, and material.

Claims for increase in efficiency of the solid top over the grid top are based on the fact that the entire top is heated by one burner; the heat being distributed by combustion to all parts of the top from that section immediately over the lighted burner and by absorption of heat from the products of combustion which are confined beneath the top. This widely distributed heat is utilized in cooking over portions of the top under which no gas is being burned. With a grid top it is possible to cook only over the lighted burner. The maximum efficiency of a solid top will be secured when cooking is carried on over the whole top surface, since the heat in the top will then be most completely utilized. However, in actual practice the whole top will not always be used and in these cases the efficiency will fall below the maximum.

Size and Arrangement of Utensils Varied

With the attachable top cold the burners to be used were lighted and water brought to boiling above them and then a state of gentle boiling maintained over a period of one hour. Other utensils of the same size, and containing equal amounts of water, were distributed over the top in varying numbers ranging from a single one placed directly over the lighted burner to enough to cover the whole top as closely as conveniently possible. Numerous arrangements were made of utensils of various sizes with the same general result. Only one series of tests, which is representative of the whole, will be described. Aluminum utensils of four quart capacity each were used in these tests and only four could be used at one time without undue crowding.

The following data were taken during the course of a test. Barometic pressure, temperature and pressure of gas, volume of gas used in making the test (V), initial weight of water (W_1), final weight of water (W_2), initial temperature (t_1) and final temperature (t_2) of water. These data were taken for each utensil. In addition the latent heat of vaporization (L) for the water in each utensil was calculated for the average temperature. (For utensils in which water was boiled for one hour the latent heat was taken as that at the boiling point, as a trial calculation showed that this assumption would cause an error of less than 0.1 per cent in the final results.) The amount of heat transferred to a utensil was then obtained from the equation

$$H = W_1 (t_2 - t_1) + L (W_1 - W_2)$$

This holds to a very close degree of approximation under the conditions of these tests. Where more than one utensil is used the total heat absorption is

$$H = H_1 + H_2 + H_3 + \ldots.$$

The amount of heat delivered is the product of the volume of gas used (V) and the B.t.u. content of a cubic foot of gas (A). The total efficiency (E) is then obtained by the formula.

$$E = \frac{H}{AV}$$

The efficiency of the grid top was determined in the same manner, with the exception that with this top only one utensil could be heated with a single burner and an additional burner was required for every additional utensil. Under this condition, provided all the burners were adjusted for the same gas rate and same type of flame, the efficiency obtained from each should be the same. Four standard burners were used on the range for these tests instead of three standard and one giant. The efficiency of the grid top can therefore be taken as that obtained over a single burner.

Adjustment of Burners for Efficiency Tests

Before making the efficiency tests the burners were adjusted for 9,000 B.t.u. per hour (for which they were designed) at the normal city pressure and the air shutters were set to give as good a flame adjustment as was possible.

It was found that the character of the flame did not change while heating was carried on with the grid top. However, as mentioned before, when the solid top became heated, the flames became much softer. In order to avoid, as far as possible, the formation of carbon monoxide as one of the products of combustion, the adjustment of the flame with the attachable top was made with all four burners in operation and after the top had become heated. This is the condition under which carbon monoxide is most likely to be formed, for the amount of air required to completely burn the gas supplied will be a maximum, while the obstruction to the supply of both primary and secondary air will also be greatest. The final adjustment was such that the resulting flame on each burner was as nearly like that obtained when using the grid top as the construction of the attachable solid top would permit.

Efficiency Test With Grid Top

An efficiency test was made using the grid top as described above. Two quarts of water were used (4.17 lbs.) and the utensil was left uncovered. This was done to increase the amount of water evaporated, and thus reduce the error in its determination. The average efficiency from several such tests was 39.3 per cent.

The grids were replaced by the attachable top and the burners adjusted as described above. The first test was made with one front burner lighted and only one utensil used, this being placed directly over the lighted burner but with the solid lid in

place. With this condition the water in the utensil could not be brought to boiling in a reasonable period of time. All subsequent tests were, therefore, made with the lids removed from above the lighted burners. The utensils used were of a size which fitted exactly into the hole made by removing the solid lids.

Efficiency Test With One Front Burner Lighted

The efficiency with one front burner lighted was determined with and without the stove lids removed from above the unlighted burners. In those cases where no utensil was placed above an unlighted burner the stove lid was left in place. The results obtained when varying numbers of utensils were distributed on the top are given in Table 1. For convenience, the burners are numbered as shown in Figure 1. This table shows that the temperature rise obtained above unlighted burners was not sufficient to be useful for cooking purposes nor was it sufficient to maintain a cooking temperature in a completed process. Therefore, the practical efficiency of the top under the conditions of these tests cannot be taken to be greater than that of the utensil above the lighted burner (34.3 per cent). Further, practically no difference in temperature rise of water was obtained in the cases where stove lids were or were not used above unlighted burners. The chief claim to increased efficiency of the solid top over the grid top lies in the fact that the products of combustion are confined under the top for a time and part of their heat content transferred to the top and then to the cooking process. The amount of heat transferred in a given time depends entirely on the difference in temperature between the under side of the top and the material to be cooked. If more than one burner is lighted, the volume of products under the top is increased, and it is possible that the temperature difference mentioned above may be increased, resulting in increased efficiency and higher temperature rise of the water in utensils above the unlighted burners. The burners were therefore operated in pairs and the results obtained are given in Table 2. In these tests it will be noticed that the average efficiency obtained above the lighted burners is about 3 per cent higher than when only one burner was used. This variation is explained by the difference in the character of the flame in the two cases. The burners were adjusted when all four were being used so that when one burner is used alone the flame is very hard. When two

TABLE I

Heat absorbed by utensils in position above each burner when burner No. 1 only was lighted. Expressed as efficiency (per cent of heat liberated from gas).

Water brought to boiling in utensil above burner No. 1 and gentle boiling maintained for one hour. No lids on utensils. No stove lid above burner No. 1.

Test No.	Position No. 1 Efficiency Per cent	Position No. 2 Efficiency Per cent	Position No. 2 Temp. rise Deg. F.	Position No. 3 Efficiency Per cent	Position No. 3 Temp. rise Deg. F.	Position No. 4 Efficiency Per cent	Position No. 4 Temp. rise Deg. F.	Total efficiency of all utensils Per cent
				Lids above unlighted burners				
2	33.5	...	...	...	...	...	...	33.5
4	33.6	2.37	39.1	...	...	...	...	36.0
5	34.55	2.59	40.4	2.81	42.5	...	...	39.9
6	34.85	2.61	38.6	2.88	42.2	1.63	26.8	42.0
				No lids above unlighted burners				
7	34.15	2.99	51.5	...	...	...	...	37.1
8	34.65	3.24	54.2	2.23	38.6	...	...	40.1
9	34.90	3.08	44.5	2.81	43.9	1.72	26.7	42.5

Note: Blank spaces indicate that no utensil was placed in those positions.
Average efficiency obtained over burner No. 1 = 34.3 per cent.

TABLE II

Heat absorbed by utensils in position above each burner when burners were operated in pairs. Expressed as efficiency (per cent of heat liberated from gas).

Water above lighted burners brought to boiling and gentle boiling maintained for a period of one hour. No stove lids above lighted burners. Stove lids above unlighted burners.

Burners lighted position	Efficiency over lighted burners per cent	Efficiency over unlighted burners per cent		Temp. rise above unlighted burners degrees F.		Total efficiency of all utensils per cent
No. 1 & No. 3	37.1	No. 2 — 1.7	No. 4 — 2.45	No. 2 — 56.3°	No. 4 — 78.0°	41.3
	36.7	No. 2 — 1.8	No. 4 — 2.33	No. 2 — 58.2°	No. 4 — 73.7°	40.8
No. 2 & No. 4	36.6	No. 2 — 1.8	No. 3 — 2.0	No. 1 — 53.5°	No. 3 — 56.3°	40.3
No. 1 & No. 2	37.3	No. 3 — 2.06	No. 4 — 2.46	No. 3 — 64.5°	No. 4 — 77.1°	41.8
No. 3 & No. 4	38.3	No. 1 — 1.39	No. 2 — 1.44	No. 1 — 42.2°	No. 2 — 42.3°	41.3

Average efficiency obtained over lighted burners = 37.3 per cent.

burners are used the increased volume of products excludes a portion of the secondary air and softens the flames, bringing the hottest portion closer to the utensil and thus effecting a greater rate of heat transfer. It will be noted that little was gained in operating two burners. The maximum temperature of the water in utensils above unlighted burners was not more than 145 degrees F. This temperature is not high enough for cooking and the practical efficiency of the top may again be taken as that of the lighted burners. Tests with three burners lighted showed no better results.

Test to Determine Whether One Burner Will Keep Water Boiling in More Than One Utensil

This test was made to determine whether one burner would keep water boiling in more than one utensil if the water in the other utensils had previously been brought to this temperature. A utensil was placed above each burner and the water brought to boiling in each. The gas was then turned off beneath all utensils except one. Boiling stopped almost immediately in all utensils except the one over the lighted burner.

Comparison of Efficiencies Obtained With Attachable Solid and Grid Tops

The preceding tests show that: (1) Boiling temperature cannot be maintained in any utensil on a portion of the top under which no gas is being burned; (2) the maximum temperature rise secured in utensils above the unlighted burners is not more than 70 degrees F. when the range is operated in a normal manner for a period of one and a quarter hours.

When the utensil above the lighted burner was placed directly in the hole formed by removing the lid, the efficiency was 34.3 per cent as compared to 39.3 per cent obtained with the grid top, a decrease of 12.7 per cent. The use of the lid above the lighted burner reduced the efficiency from 34.3 to 18.8 per cent. When two burners were used under the solid top the efficiency was 37.3 per cent, or about 5 per cent lower than that obtained with the grid.

One manufacturer of an attachable solid top asked the Bureau to make a study of the efficiency of his appliance. He wanted a comparison made with a grid top and requested permission to be present while the tests were being made. This request was granted and in addition he was allowed to make the burner adjustments. Tests were made using one burner and with three utensils on the top. A test was then made with the grid top using three burners with a utensil over each. A comparison of the results showed that 14 per cent less gas was used with the grid top using three burners than was required with the solid top using one burner, the same transfer of heat to each utensil being accomplished in each case. This result was accomplished in spite of the fact that the solid top was given the advantage of preliminary heating before beginning the measurement of the gas.

Conclusions

Numerous tests of combustion products from well designed grid top ranges have shown that when the burners are properly adjusted practically no carbon monoxide will be found unless the burners are operated at an excessive rate, more than 12,000 B.t.u. per hour for a standard burner and 16,000 B.t.u. per hour for the giant.[3]

However, if the grids are replaced by an attachable solid top, even when the burners are adjusted to an extremely hard flame, it is impossible to maintain a good type of flame and to secure complete combustion after the top has become heated. This results mainly from a lack of adequate means for carrying away the burned products, which cause a partial exclusion of the air necessary for combustion.

Moreover, the efficiency tests of this type of top have shown that in no case, under the conditions of this report, could the cooking efficiency obtained equal that of the grid top. The only advantage in the use of such a top is when several dishes are being prepared at the same time and some require longer to cook than others. Those which are finished first can be kept warm by setting them back on the top during the remainder of the cooking process. However, this does not necessarily mean an increase in efficiency, but is merely a convenience, for the same effect can be accomplished on the grid top stove without using any more gas by turning the burners low under the finished dishes.

The most important result of this investigation is that it clearly shows the danger to health caused by the indiscriminate use of attachable solid tops on ranges designed for use with grids.

[3]Technologic Paper 222, Relative Usefulness of Gases of Different Heating Value and Adjustment of Burners for Changes in Heating Value and Specific Gravity.

GAS-HEATED BATHTUB OF EX-KAISER FOR SALE

The offering for sale in Essen, Germany, of an ornate copper gas-heated bathtub bearing the imperial arms of the Hohenzollerns and once used by former Kaiser Wilhelm recalls the unique and humorous early history of that now indispensable fixture, comments the Pennsylvania Public Service Information Committee.

When bathtubs were first introduced into the United States in 1840, newspapers condemned them, politicians made eloquent speeches against them, and doctors held them up as a menace to health. In 1843 Virginia levied an annual tax of $30 on every bathtub. A Boston ordinance forbade the use of them except when ordered by a physician.

The kaiser's old tub which now approaches the auction block was constructed in 1891 when gas stoves were a novelty and gas was used exclusively for lighting.

Moulding Public Opinion

Discussion of various media for developing the good will of the public

By R. J. W.

WHENEVER I hear the term "Public Relations" I think of our ex-office boy, Pete. Pete was tough. His admission of toughness was unnecessary, for it was self evident. He was a typical tenement offspring, educated in the streets and with the inherent opinion of that phase of the theory of the survival of the fittest that concerned fisticuffs and battle. The Italian brain probably was dominant in his mixed ancestry, and a certain gleam in his eye foretold of shady connivances and gang relationships.

Part of the regular office routine was the emphasis upon Public Relations, encouraged by the various executives. Pete, the immune, never even appeared disinterested—he was so far away from the world of business and its accompanying interests that he did not even concern himself with his contempt for it. Apparently, the constant repetition of Public Relations had made no impression on Pete's mind.

One morning the news went around the office that Pete was in jail. It seemed that a group of toughs idling near a pool-room had, in a spirit of braggadocio, decided to stage a hold-up to strengthen their impoverished finances. Resistance on the part of the victim prompted a nervous finger to shoot. A man lay mortally wounded and Pete was rounded up by the police net that followed the crime. Silent, half scared, yet half defiant, Pete sat in jail.

"It wouldn't be good public relations," said Pete.

The feature of the trial was Pete's statement. Circumstances had placed Pete and another fellow in the State's attorney's final consideration, and the fact that the gunman had been abusive in his demands led the prosecutor to concentrate on the cursing proclivities of the two boys left. Pete was being cross-examined and had just answered in the negative the question, "Would you curse at a man you were holding up?" when the judge chanced to interpose, "Why wouldn't you?" Pete's answer settled the case. Without hesitancy, and as if it were a life's ideal, Pete said, "Because it wouldn't be good Public Relations."

Power of Public Opinion

"It matters not," said Samuel Insull, successful utility operator, "how much capital you may have, how fair the rates may be, how favorably may be the conditions of service, if you haven't behind you a favorable public opinion you are bound to fail."

Public Relations is Public Opinion, favorable or unfavorable as the case may be. Favorable Public Relations is not impossible to attain and, as in the case of Pete, it will penetrate the hardest armor if sufficient time is allowed.

Speech-making is not Public Relations. Speech-making may be and usually is, an accessory for the development of Public Relations, but speech-making alone is not Public Relations and is not the means of obtaining it. Public Relations is Public Opinion alone. Public Opinion is a state of mind which, as in the case of Pete, may be germinated without notice or knowledge.

"One of the characteristics of the American businessman," says Robert R. Updegraff, "is his genius for utilizing the force of publicity in molding public opinion. American business has developed within the past few years a technique which consists of 'laying th e cards on the table!'"

No matter how humble the individual or how exalted the corporation or institution—he or it is, as Paul wrote in his letter to the Hebrews, "compassed about with a great cloud of witnesses." It is not publicity that is pitiless; it is this cloud of witnesses which form "The Public." They are pitiless. If they think well of us and our interests, we have earned their good will; if they do not we should fail of any great or lasting success for ourselves or our interests.

"Keeping in the Right Attitude"

"You know," said an old gentleman of the somewhat older school, "prayer is not a matter of words; prayer is an attitude. God's attitude toward man is perfect; it remains only for man to get into the right attitude toward God—into the attitude of saying and feeling 'Thy Will be done.' That is prayer."

Publicity is, in business or temporal matters, what prayer is in matters of the spirit. It is a problem of putting or keeping a business or institution in the right attitude toward the public and then letting the people know about it.

That is the process of obtaining favorable Public Relations, which is nothing more than favorable Pub-

lic Opinion.

It is safe to say that over ninety per cent of our general information is indirect. We are confined to one city, to one community, or to one group; while we might, if we try hard, learn of every action of our group, community or city by direct experience, it grows impossible to do so as the area enlarges. A visit to another location merely re-arranges the groupings and does not to any great extent expand the direct picturization.

Utility employees working in a gas plant cannot, unless they have had some form of direct experience, form an accurate view in their minds of, say, a dress and garment sweatshop. It is not difficult to see, then, why the average person cannot or does not think of a gas plant as the gas-maker thinks of it.

The gas worker would, however, form a picture of a sweatshop in his mind, were he confronted with the idea, as would the average man picture a gas plant—something indefinite, but yet a picture. After all, that is what we do with every idea—form a picture. The picture is accurate as our DIRECT experience is concerned and varies as to the sharpness of the detail; nevertheless, men are influenced by the pictures which form in their heads as the ideas are presented.

A Proper Stage Setting

M. de Pierrefeu tells of a photographer's visit to Joffre in which the general was in his "middle class office, before the work-table without papers where he sat down to write his signature. Suddenly it was noticed that there were no maps on the walls but, since according to popular ideas it was not possible to think of a general without maps, a few were placed in position for the picture and removed soon afterwards." The only feeling that anyone can have about an event that he does not experience is the feeling aroused by the mental image of that event.

"We must know particularly one common factor," says Walter Lipman, "it is the insertion between man and his environment of a pseudo-environment. To that pseudo-environment his behavior is a response, but because it is behavior, the consequences, if they are acts, operate not in the pseudo-environment where the behavior is stimulated but in the real environment where the action eventuates. If the behavior is not a practical act but what we call, roughly, thought and emotion, it may be a long time before there is any noticeable break in the texture of the fictitious world; but when the stimulus of the pseudo-fact results in action on things or other people, contradiction soon develops.

"The analyst of Public Opinion must begin by recognizing the triangular relationship between the scene of action, the human pictures of that scene, and the human response to that picture working itself out upon the scene of action."

"Modern society," says G. K. Chesterton, "is intrinsically insecure because it is based on the notion that all men will do the same thing for different reasons—that all men for all time will go on thinking different things and yet doing the same things, is a doubtful speculation. Four men may meet under the same lamp post; one to paint it pea green as part of a great municipal reform; one to read his breviary in the light of it; one to embrace it with accidental ardor in a fit of alcoholic enthusiasm; and the last merely because the pea green lamp post is a conspicuous point of rendezvous with his young lady. But to expect this to happen night after night is unwise."

Substitute for the four men at the lamp post the governments, the parties, the corporations, the societies, the social sets, the trades and professions, the universities, sects, and nationalities of the world. Think of the legislator voting a statute that will affect different peoples—an editor demanding a war—a clergyman calling upon the police to regulate amusement—an Irishman in Cork thinking about an Irishman in Belfast—a board of directors confronted with a set of their employees' demands. It is not so different from Mr. Chesterton's four men at the pea green lamp post.

Those features of the world outside which have to do with the behavior of other human beings in so far as that behavior crosses ours, is dependent upon us or is interesting to us, we call, roughly, public affairs. The pictures inside the heads of these human beings, the pictures of themselves, of others, of their needs, purposes and relationships, are their Public Opinions. These pictures which are acted upon by groups of people or by individuals acting in the name of groups are Public Opinion.

Walter Lipman holds that there are, however, inconsistencies of this pseudo-environment that tend to alter, change or destroy the "pictures in our heads."

What Is Confidential?

That Public Opinion is variable and dependent entirely upon the circumstances which it creates is evident. Many elements enter into the correctness or entirety of the news, hence causing a variation in the pictures of our minds. He outlines some of those elements as:

1. Censorship and Privacy. As in time of war, dispatches must necessarily be withheld, delayed or ambiguous, so, too, it is possible that common business events must sometimes be restrained from being broadcast because of the privacy of their nature which might, in the hands of competitors, be detrimental. This does not mean that dishonesty is sanctioned; it merely grants that there are some business thoughts that necessarily must remain confidential.

The notion of what constitutes a person's private affairs is elastic. The sale of a piece of land is not private, but the price may be. The profits of big corporations are more public than those of small firms. Certain kinds of conversation between lawyer and client, doctor and patient, priest and penitent, are privileged. Directors' meetings are usually private; many people regard the contract between employer and employee as private. There was a time when the affairs of all corporations were held to be private as a man's theology. There was a time before that when his theology was held to be as public as the color of his eyes. The history of the notion

of privacy no doubt would be entertaining—sometimes the notions conflict violently, as when Mr. Hughes investigated the life insurance companies, or when the bolsheviks published the secret treaties, or when scandal exudes from the pages of "Town Topics" to the front pages of the "yellow" newspapers.

Whether the reasons for privacy are good or bad, privacy is insisted upon in all public affairs. That causes difficulty for the executives who are honest but who must be discreet, while the public clamors for facts.

What Creates Public Impression?

2. Contact and opportunity. The size of a man's income has considerable effect upon his access to the world outside his neighborhood. With money he can overcome almost every tangible obstacle—he can travel, buy books, and bring within the range of his attention almost any known fact of the world. The individual's income determines to great extent the amount of communication possible; but men's ideas determine how that income shall be spent, which in turn affects in the long run the amount of income they will have; additional inconsistencies of the pseudo-environment.

3. Time and Attention. It is possible to make a rough estimate only of the amount of attention people give each day to informing themselves about public affairs. Yet it is interesting that three different estimates, made at different times and at different places, and by different methods agree fairly well. Possibly you could agree that the average man spends a little more than a quarter of an hour on his newspaper.

4. Speed, Words, and Clearness. Unseen environment is reported to the press chiefly by words. These words are transmitted by wire or radio from the reporters to the editors who fit them into print. Telegraphy is expensive and the facilities are often limited. Press service news is usually, therefore, coded.

Eye-witnesses, their accuracy unknown, report to the makers of "authentic reports"; they in turn transmit these to a commission thousands of miles away. It prepares a statement, probably much too long for publication, from which a correspondent culls an item of print three and a half inches long. The meaning has to be telescoped in such a way as to permit the readers to judge how much weight to give to the news.

Words Are Like Currency

Words, like currency, are turned over and over again, to evoke one set of images today, another tomorrow. Men command fewer words than they have ideas; and language, as Jean Paul said, "is a dictionary of faded metaphors." Necessarily, the ideas evoked by the words we read form the biggest part of the original data of our opinions. The world is vast, the situations that concern us are intricate, the messages are few, the biggest part of opinion must be constructed from imagination.

When we use the word "Mexico" what picture does it evoke in the mind of a resident of Boston? Very likely it is some composite of sand, cactus, oil wells, greasers, rum-drinking Indians, testy old cavaliers flourishing whiskers and sovereignty, or perhaps an idyllic peasantry a la Jean Jacques, assailed by the prospect of smoky industrialism and fighting for the Rights of Man. What does the word "Japan" evoke? Is it a vague horde of slant-eyed yellow men, surrounded by Yellow Perils, picture brides, fans, Samurai, banzais, art and cherry blossoms? What does the Arkansas rice farmer think of "corporation"; what does the contented Florida millionaire think of "service" in a storm-swept northern city?

Thus the environment with which our public opinions deal is refracted in many ways—by censorship and privacy at the source, by physical and social barriers at the other end, by the poverty of language, by distraction, by unconscious constellations of feeling, by wear and tear, violence, monotony. These limitations combine with the obscurity and complexity of the facts themselves to thwart clearness and justice of perception, to substitute misleading fictions for workable ideas, and to deprive us of adequate checks upon those who consciously strive to mislead.

It is evident that men are influenced by the pictures in their heads; that is, by the mental images established by indirect perception of distant things seen only through the press, motion pictures, magazines and other media, of which the press is most dominant. This pseudo-government is not always accurate, as has been shown.

It is our duty, then, to produce or cause to produce such favorable pictures in men's heads as to create favorable public opinion.

The press is dominant in the creation or development of public opinion. Public opinion, however, must be organized for the press if it is to be sound, not by the press as it is today.

Organizing Public Opinion for the Press

To tell the utility story "truthfully and in simple, whole-hearted manner" as recommended by so many executives today, seems plausible, but it is not always sufficient. Try as you will, you cannot get the spread of circulation, which is so necessary, unless you can ally yourselves with the Fourth Estate. No matter how many meetings, luncheon groups, associations and the like your speakers can address, you cannot even scratch the surface of the publicity necessary to secure complete, satisfactory Public Opinion, unless the press aids in spreading the story.

The reason is obvious. Take a group of speakers—assume each is well equipped to deliver his subject capably—and send them out to talk to the people. Whom will they address? They will speak before business clubs and conventions, before women's clubs and chautauquas, and will impress at least fifty per cent of their audiences. Then, unless the editor of the local paper is sold, the "truthful story, simply told," fails almost entirely.

There is little doubt but that the press is dominant in the field of Public Opinion. It is also evident that the press has a variance of opinion on the subjects of general interest. The biggest op-

portunity of obtaining complete, satisfactory Public Relations is through the press—but the problem of utilizing the press to its fullest advantage is the vital point in Public Relations today.

News editors are human. Though it is the newspaper's ideal to publish the news and nothing but the news, it is easily possible to publish the same news from many viewpoints. Your story is as good as your editor makes it.

Consider the small town editor. In the villages and towns the paper is hardly self sustaining. The editor feels that his paper is the life of the community and therefore should be sustained. The most practical method of sustenance is the purchase of advertising space, and unless you advertise, probably not wisely but well, in the village gazette, your public relations have suffered a decided set-back. A hungry editor minces no words.

As towns grow into cities, competition between papers maintains the advertising income curve, but local opinion is molded more by political thought than by self-sustaining motives—which, in the final analysis, may be resolved to the same thing. But anyway, the political viewpoint inspires the copyreader as well as the editor, and a Democratic paper doesn't always approve of a Republican commission's actions.

The metropolitan paper usually is financially interested in public affairs, at least through its directorship, and its trained editor has long ago learned how to write to his paymaster rather than to his public. Added to all this—in all stages of newspaperdom come common, everyday prejudices—personal, religious, sympathetic—all things that constitute and complicate human nature. Clearly, the text books are incomplete; they go no further after saying, "tell the story truthfully."

Which Story Is Printed?

Consider Speaker M. who addressed the Rotary Club. Editor A. might have heard him personally; at least Editor A's reporter heard him and jotted down the high spots. Possibly the speech was sent to the newspaper office, neatly typewritten and formally released by a wideawake publicity man. Maybe Editor A. will publish it, at least in part, for newspaper often use shears out of professional pride rather than logical discrimination. If it's printed in substance, even, it is fortunate.

But perhaps Editor A's make-up man has to choose between the speech and a fire in Brown's Shoe Store —probably there's just so much room around the advertising, and type, not being rubber, remains disgustingly unpliable. The story is cut to a notice, or the story is left over, and tomorrow is another day, full of another day's news, and so on until the story is quite dead.

Again, perhaps Editor B. doesn't like the secretary of the Rotary Club and though a public spirited citizen, he really doesn't care to push that organization to the front. Or he might be very close to Commissioner X. of the public service board, and Commissioner X. doesn't like the utility company for some reason, personal or professional. Then, too, Editor B. might have lost some money once through a fraudulent investment in utility stock from which investigation would have warned him. Again, his lights might have gone out last night at dinner, he might be of different faith or lodge from the local utility man and take such differences seriously. He might be booming a local man for city office who thinks differently; he might have read La Follette, studied Schopenhauer, or memorized Carl Marx—at any rate, the story isn't given the zest it should be given, if printed at all, and the well prepared, excellently given speech falls by the wayside, after having but momentarily impressed thirty or sixty hungry business men, who came just to show themselves as active, enterprising business men, and with the purpose of eating fully their seventy-five cents' worth.

It's All in the Point of View

It is so easy to divert the thought by apt handling of the facts. It depends upon which side the editor is on. Lights darkened during a storm may be the "wrath of God," though faithful employees fought the elements in their effort to maintain service, or "these periods of darkness are becoming a nuisance and the light company certainly should give better service, considering the rates they are charging." It depends upon which side of the fence the editor sits.

Such occurs daily. Only a few months ago a utility company in a spirit of economical and scientific judgment that was reflected in lower rates, regrouped two districts and eliminated one district office. It will take six months of extreme diplomacy to readjust the public opinion in that town, those close to the two employees who were released will never overcome their distaste for the "heartless corporation" that had done the deed. To say nothing of the merchants who solicited and received the local office's trade and benevolences.

I have gone to length to detail the inconsistencies of the public press, mostly to emphasize the fact that human nature cannot be card-indexed. To control public opinion you must control the press which, ipso facto, is impossible. Since we cannot control the press, we must exert an influence by organizing opinion for the press.

How, then, can we organize opinion for the press? It would be poor business to attempt to subsidize the press, because even if it were possible to do so completely—and it is humanly impossible to do so—it would be foolish because it would soon become evident and thereby tear down more than the subsidization could hope to build up. At any rate, it wouldn't be honest, and unless we are honest we might as well quit this business and enter one more remunerative.

If we have a story that the people should know, and if it is sound, truthful and interesting—I say interesting because even the most partisan of papers professes to print only the news—let us tell it. We do think we have a sound story that when truthfully told will animate the public into understanding and favorable public opinion; so let us, then, tell it.

Naturally, we will run into the inconsistencies of human nature, as outlined before, to say nothing of

the Fourth Estate. Therefore, we have to sell ourselves, our company, our idea to the editors, and this is no mere back-door order-taking job. The only way to break down prejudices, to overcome irrationalism or to compete with intolerance is to build up truthfulness, to inspire confidence, and to practice what we preach.

To Friend and Foe Alike

First of all, play fair. If a news story "breaks," give it to foe as well as friend, for no newspaper enjoys being "scooped." Even favor, if possible, the arrogant paper, and above all, show that you are trying to co-operate.

Some times in this instance, it is well to study the paper from other standpoints than news. In a certain city of some 160,000 inhabitants the dominant paper of the three dailies realizes its prominence and therefore must be pampered, which is only natural. Unless the news release is for its evening use it is unnoticed; the wise publicity man caters to this paper and gets maximum lineage, for the other papers but follow the leader.

Buy advertising space fairly. If the paper in opposition is the best medium from a purely advertising basis, use that paper most heavily. If it is the weakest, it won't hurt to recognize its advertising appeal now and then, even if its editorial strength is dimmed by its competitors. Don't buy publicity—buy advertising space and use it scientifically to sell your company or merchandise to the public, but remember that paid advertising space and not circulation or civic esteem prints a newspaper.

I know of an instance where a gas company, harassed by a contrary minded paper was thoughtlessly allowing its advertising to be placed by an employee of a competing paper. You can imagine the ill-feeling, to say nothing of the broken ethical code. It is little wonder that the anti paper, to protect itself, demanded that the utility place its copy through an agency or else no space privileges would be given. And, as the misguided executive responsible for this unfortunate circumstance chuckled over the "vengeance wreaked" upon the discomfited antagonist, or was unmindful of the harm being done, the president of the utility wondered, as he strove for amicable relations, why the paper would not even play fair.

There are many other successful practices to be followed out by the men in contact with the press, the details of which are thoroughly understood by every capable advertising man.

One thought arises here, however, and it is that the so-called publicity specialist who creates publicity campaigns "without a basis of fact or reason" should be taboo. He and his practices are unsound economically and ethically, and certainly result in final destruction of public confidence.

"Good public rellations," said B. J. Mullaney, vice-president of the Peoples Gas Light and Coke Company, Chicago, in an address before the American Gas Association at San Francisco, "is established by making our respective companies and their service worthy of being well thought of, and by telling our customers, the public, all about our companies and service in detail, every detail that can possibly concern or interest them. Silence is easily mistaken for secrecy; secrecy breeds suspicion; and suspicion, if not checked, soon ripens into hostility. Good public relations may become bad even when service is good. It has happened."

This paper has been long—far too long to be interesting, yet far too short to cover the subject. An attempt has been made to define Public Relations by saying simply but thoughtfully that Public Relations is Public Opinion, and though reams of definitions by esteemed leaders might be quoted, it is no more, no less.

Time has been taken to describe the "pictures in our heads"—Public Opinion—because I believe this phase has never been fully considered except by a few of the literati whom we carefully avoid, yet among whom may be found traces of intelligent thought. It was then shown how Public Opinion may vary because of the inconsistencies of the pseudo-environment in which we live.

Although specific in example, that part of this article attempting to outline the methods of acquiring favorable public opinion remains hazy because the idea contained must infuse itself into one's mind and cannot be driven. Timely thought only will make one realize that the success or failure of creating favorable Public Opinion—favorable Public Relations—lies primarily in the power of those executives who can make public opinion by their activities and skillful manipulation. The press is dominant, I repeat, in the creation or development of Public Opinion. Public Opinion, however, must be organized for the press if it is to be sound, not by the press as it is today.

Service Justifies Existence

Supplementary to this must, of course, be the phases that go to make up successful utility operation, such as employee education and the giving of good service. Say what you will about cordial relations between company and customer; say what you will about any phase of utility life; yet there is only one reason that justifies the existence of a public utility, and that is service, which includes more than the mere constancy and adequacy of supply, but which combines the lowest possible rate for the service given.

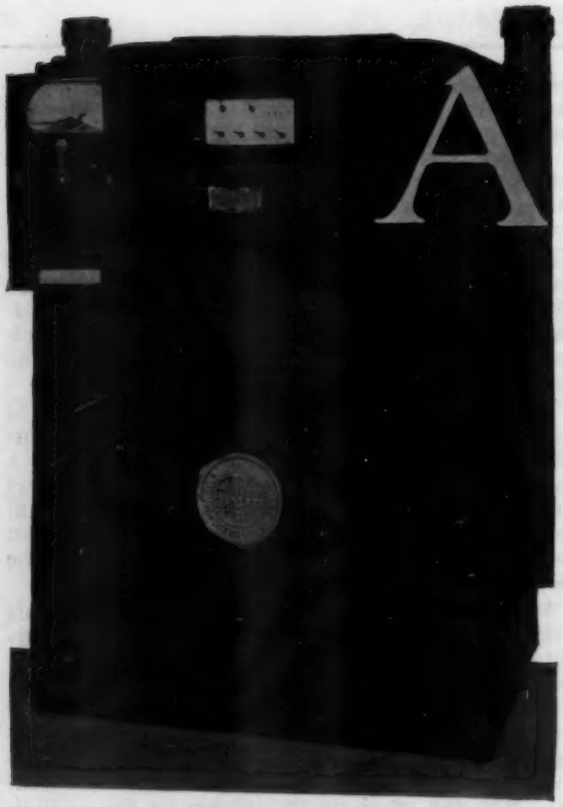
"Courtesy to the public, and the best possible service constitute the fundamental cornerstone of our policy," said Samuel Insull. "We should aim at nothing but the best, and we should aim at that service in such a way as to conform, as far as we can, not only to the good judgment of the public and to their proper desires, but also to their peculiarities and idiosyncrasies."

"Our first duty and our first interest, an interest beyond everything else, is to square the rights of the public with those of the stockholders," Mr. Insull said several years later. "Our income, our earning capacity, is dependent primarily, in my judgment, upon public good will; and we cannot get that unless we convince the public (by word and deed) that we are treating them honestly and giving them a square deal."

A Year's Experience with a Demand Rate for Gas Househeating

By H. C. Deffenbaugh

Statistician, Rochester Gas and Electric Corporation.



Recently developed demand meter

ON September 1, 1926, the Rochester Gas and and Electric Corporation made available an optional gas heating rate which consisted of a monthly demand charge of $5.00 per hundred feet of demand plus 50 cents per thousand cubic feet of gas used. This rate applied to domestic heating installations where heating was done in a central gas-fired system. The rate covered not only the gas used for heating, but other domestic purposes as well, all gas being metered through one meter with which there was incorporated an attachment to register the maximum hourly demand.

The argument has often been advanced that there is no necessity for a measured demand rate for residential heating and that a flat rate for gas heating is all that is necessary. In other words, if a company is satisfied with an average revenue of 75 cents per thousand cubic feet for gas heating, there is no necessity of complicating their rate system by a rate form which will allow one customer to get gas for heating at 68 cents per thousand and another at 85 cents per thousand, as long as the average of 75 cents per thousand is maintained.

It is assumed that the amount of gas used monthly is a function of the weather conditions and that if these conditions are averaged over a period of years the average cost of gas heating can be determined and thus an average rate may be promulgated. This theory entirely neglects the fact that during the same heating season there will be a wide difference between the load factors of different customers and consequently there will be a similiar difference in the cost of service between customers. A couple of years' experience with a block rate for gas househeating and studies made by the use of curve drawing gas demand instruments indicated to us the advantage of a demand form of rate.

The advantages of the two-part rate based upon measured demand are as follows:

1. It follows more closely the cost of service than any other rate.

2. As the charge is based upon measured demand it offers an incentive to customers to keep their demand at a minimum. This gives them the advantage of a low rate and helps us in eliminating the peak load characteristics of this class of business, thus making available additional capacity for other customers.

3. It offers a low rate for use of gas for other domestic purposes in the home, as all gas used which did not increase the maximum demand will be paid for at the commodity rate only.

4. It equalizes bills between months. On the sliding scale rate, the gas bills for December, January and February heating were high in proportion to the other months and these high bills were always a source of complaint. The demand rate smooths these out. On the sliding scale the maximum month's bill averages around 30 to 40 per cent over the maximum month's bill on the demand rate for the same annual consumption. Although the bills for summer consumption are higher than they would have been on the sliding scale rate, there is little objection to this from the customers as they know that the total annual cost on the demand rate is less than on the sliding scale.

5. The adoption of a demand rate for domestic purposes would be the first step in popularizing the demand form of rate for gas. We had begun laying our plans for an industrial gas demand rate but here we were confronted with the difficulty of metering demand. On single meter jobs, such as in the househeating installations, the demand metering situation was simple, but on multiple meter industrial jobs it was an unsolved problem. We anticipated that the solution would be obtained in time and that the use

of the demand rate for heating would make easier the introduction of the industrial demand rate when we were in a position to make it available. The gas heating customers number many of the influential business men who, we anticipated, would want a similar form of rate in their factories. Our surmise has proved true for we have received many such inquiries. As a result our industrial gas demand rate has just been filed and, although the demand meter situation has not yet been completely solved, we feel that in this we will be no worse off than we were in the electrical end of our business when we put into force an industrial electric demand rate and then struggled several years before satisfactory electric demand meters were on the market.

In amplifying the advantages of the gas demand rate as stated above, we have all the literature which has been sent out in recent years by the American Gas Association which has advocated the use of two or three part rates as a solution for the difficulties experienced by the gas companies in developing business and in eliminating the unprofitable customer. If rates can be based upon cost of service, then the customer who has some control over the rate will naturally get the greatest benefit with the demand form of rate for heating. The customers themselves try to manipulate their operation to save on the demand charge by shutting off the heating equipment when a large amount of gas is being used for other purposes, as for instance, on wash day, or in times of severe weather by shutting off some of their bedrooms in order to keep down the demand on the furnace.

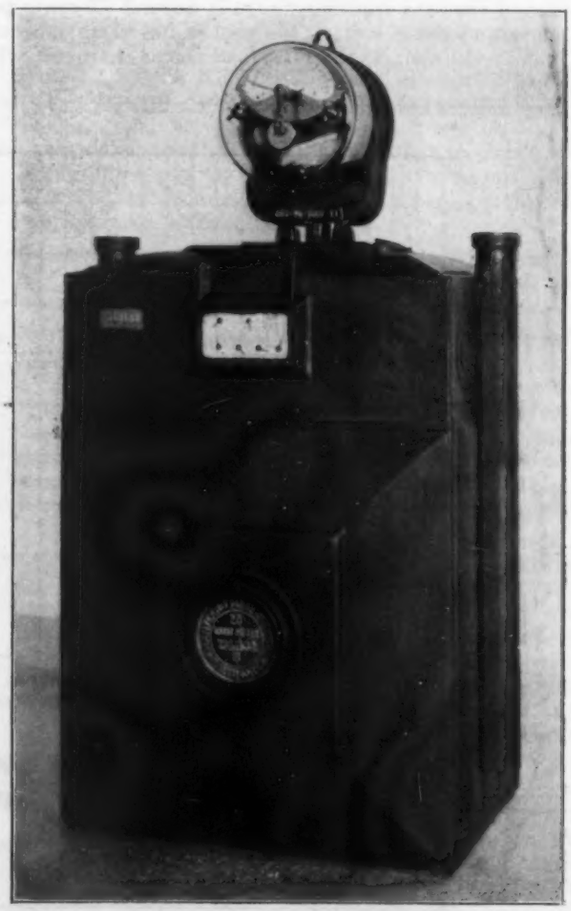
Securing a Low Rate

In one case a simple pipe connection was made from a storage water heater to the gas pressure regulator on the furnace so that when the storage water heater was using gas the furnace would be automatically shut off. This reduced the demand from what it would have been had both the furnace and the water heater been on at the same time. Naturally such an arrangement would not be employed where an instantaneous water heater is used as there would be a liability of an explosion in the furnace if the water heater is only on for a few moments and the furnace should come on again before the residual gas in the burners had a chance to escape through the flue. As a result of these economies some customers were able to get gas for heating at a rate as low as 68 cents, while the average for all customers was 79 cents. Naturally we encourage such efforts, for all demand eliminated means just so much more main capacity that will be available to other customers.

In measuring the customers' demands we used a simple demand meter attachment, placed on the tin meter, which would indicate by a pointer the maximum amount of gas consumed in any hour during the weekly period between rewinding and resetting the demand device. These meters were made up for the Gas Department by the Electric Meter Department and was the happy result of having both the gas and electric properties combined in one company and both Gas Meter and Electric Meter Departments located in the same building. The Electric Department had on hand quite a number of old General Electric type "M" demand indicators for direct current service. Due to the fact that alternating current had displaced direct current in certain parts of the city, these demand devices were surplus stock and probably would never have been used again. It was an easy matter for the mechanics in the Electric Meter Department to replace the electric actuating mechanism with a couple of gears and levers so that the device could be operated mechanically by the tin meter. We made up over 100 of these devices and their operation was so successful that we are now making up 200 more from the standard parts of this same device, except that at present we are mounting the device in the front of the meter rather than on the top as had been the case of the devices originally made.

Demand Meter Eliminates Errors

These devices have shown us that any standard method of estimating demand on burner rating would have been inaccurate. In a considerable number of cases the total furnace and domestic demand was less than the rating of the furnace burners. This sometimes was due to the fact that it had been impossible to get a furnace of just the right size and to insure adequate heating it had been necessary to in-



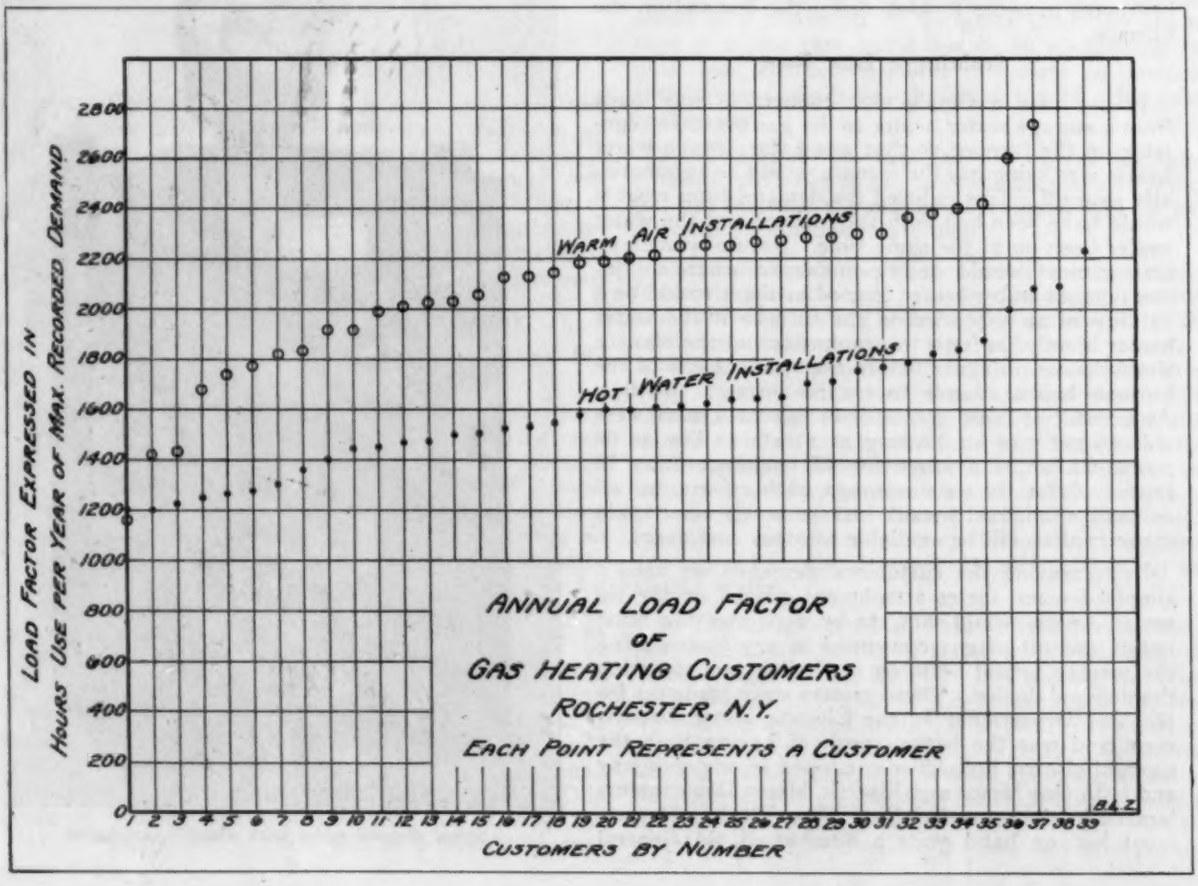
Original demand meter with obsolete attachment

stall a larger size furnace than was theoretically necessary. In other cases customers have found it possible to run their burners at less than rated capacity and thus economize on the cost of gas. The use of the demand meter has eliminated all chances of error in discrimination that might have been possible had a rated demand been used.

From the data obtained from the indicating demand meter and also from a dozen of the curve drawing type, we have been able to make a careful check on the cost of service. We have found, for instance, that we can take on around 500 heating jobs without materially affecting our peak hour conditions or disturbing our annual load factor. The cost of supply of these customers is practically production cost. While offhand this shows a handsome profit in our present business, it is offset to a considerable degree by the expensive experimental development and sales work and the cost of getting this class of business started. We have adopted a conservative attitude toward this new line of business and have not dropped the rate below a price at which we could take on an unlimited amount of business. A careful survey was made as to future investment in plant and distribution system in case a large amount of heating business should be taken on and we have found that the limiting figure is around 72 cents per thousand cubic feet. This cost is based upon water gas production, as the poor load factor characteristics of the heating business would make the cost of supply from a coal gas plant prohibitive.

Average Rate of Eighty-two Cents

On the basis of $5.00 per month per hundred cubic feet of demand based upon maximum hourly winter peak of heating and domestic load, the average rate paid by the heating customers on the demand rate was around 82 cents. Subtracting from our total sales what they would have paid for gas used for domestic purposes leaves an average rate of 78.6 cents per thousand paid for heating. There were quite a few customers whose ratio of demand to annual consumption was such that the regular rate for residential purposes was more advantageous, so they were carried on the regular rate. The total of both classes of business resulted in a combined average rate of 82.3 cents per thousand for domestic and heating purposes and a net rate of 79.4 cents for gas heating only. As this was higher than we thought necessary in view of our limiting cost of 72 cents per thousand, we made a reduction in rate so as to make the optional demand rate available to practically all of the heating customers and to bring us an average of around 74 cents per thousand for heating. This result was accomplished by reducing the demand charge from $5.00 per month, based on the highest winter demand, to $5.00 per month for



the first 100 feet of demand plus $4.00 per hundred feet per month for all excess over 100 feet of demand The method of figuring demand was changed so that instead of taking the single highest winter demand as the basis for the twelve monthly demand charges, the billing demand for the three peak months (December, January and February) was taken as the actual maximum demand each month and for the remaining months of year as the average of these three.

We had one other difficulty to surmount and that was to take care of the customer who was away part of the winter period and used no gas. On the demand rate, if no gas was used during one or more of the winter months, the payment of the full demand charge determined by previous demand readings would eliminate any saving which a customer might make on this rate. This class of business is advantageous to us for if a customer stays off during the peak months, plant and distribution capacity is saved and our annual load factor is improved. We corrected this condition in the rate by billing only a percentage of the previously established demand, instead of the full demand, during the months when the heating system was closed down, so that the average amount paid was less than on the regular sliding scale rate.

Load Factor of Different Types of Heating Systems

As before stated, the use of demand meters enabled us to check our original assumption that there was a marked variation in load factor between different types of heating systems, as well as between heating systems of the same type. In other words, had our rate been based upon theoretical radiation from the walls of the house and independent of the size or type of heating equipment, the rate would not have represented our true condition as to the cost of service. This is shown by the accompanying curve which represents the load factor of different types of heating systems as expressed in the annual hours use of the customer's peak demand. Each point on the curve represents an individual customer, records having been obtained from 39 hot water installations and 37 warm air installations. The hours use is calculated by dividing the total annual consumption of gas used for all purposes by the respective customers' maximum hour demand as obtained by the demand meter. In other words, a customer using 500,000 cubic feet per year and having a maximum hour demand of 250 cubic feet would have an annual hours use of 2,000. From this curve it is seen that the warm air jobs had an average hours use of around 2,200, while the hot water jobs averaged around 1,600. This means that the warm air systems operated at a 40 per cent better load factor on the basis of hourly demand than did the hot water installation. As our distribution system investment depends upon hourly demand, it is evident that warm air installations are entitled to the lower rate which they earn upon a measured demand basis. Similar information on two steam installations and three vapor installations showed the steam installations with 2,100 and 2,200 hours use or about the same as the average warm air job, and the vapor installations with 1,700, 1,900 and 2,000 hours use, these showing considerably better annual load factor than the average hot water job but under the average of the warm air installations.

The high load factor of a few of the warm air jobs was due entirely to the personal attention of these customers to the operation of their heating systems, an advantage to us in keeping down the peak on our distribution system and a benefit to them in the low rate paid for gas, a condition which would be impossible on any fixed rating of demand or radiation. Some of these high load factor customers were those who had a relatively small annual consumption. Here again the demand rate has its advantages over a sliding scale form of rate as customers of the same load factor would pay approximately the same rate irrespective of size. With a sliding scale rate a small good load factor customer might never get as low a rate as a large poor load factor customer. As we must expect, in the future, to supply a larger percentage of smaller homes, we feel that the measured demand rate offers the best form for the promotion of this business.

SAMUEL REA PREDICTS GAS PLANTS WILL HEAT CITIES OF THE FUTURE

Within the next fifty years gigantic gas plants will be supplying practically all the fuel used in our cities, according to Samuel Rea, formerly president of the Pennsylvania Railroad.

Conservation of resources, particularly the elimination of fuel waste due to burning raw coal, will bring about this change, he says.

"Fuels are destined to become so valuable to the human race as a whole that they will be placed only in the hands of those who can to the greatest advantage control their combustion. Scarcely anything is more archaic, in our civilization, or more wasteful, than our individual house heating systems, in which all but a small fraction of the potential heat of the fuel is dissipated upon the outside atmosphere.

"The gas business, as a public utility, will supply practically all heat distribution in urban localities. As capital cheapens, it will become possible to construct distribution systems furnishing cheaply produced gas for house heating as well as cooking. Industries in many cases will similarly be supplied with gas for fuel instead of burning coal. We may then realize the smokeless city, and the added sunlight will greatly improve the health of urban dwellers.

"Where coal is directly used for industrial fuel, we may expect to see it applied chiefly if not entirely, in pulverized form, sprayed pneumatically into the fire box. Increasing quantities, however, will be subjected to the process of gas production, so that the products of destructive distillation may be recovered for laboratory purposes and make possible the further extension of our synthetic chemistry."

The Relation of a Collection Department to a Public Service Organization

How the San Antonio Public Service Company handles its delinquent accounts

By B. C. Reber

WHILE to the average person the necessity of a collection department in a public service organization does not seem essential, when the facts are better understood it becomes evident that such a department can function in a highly efficient manner. The enormous increase in building since the close of the war, the general increase in population and the incurring elements have all added materially to the duties of the public utility corporations, while at the same time the increase in transient trade has added to the jeopardy of collections.

San Antonio Public Service Company Building

The San Antonio Public Service Company, handling 70,000 accounts, has a highly efficient collection department which has been in operation for three years. It is under the management of Z. L. Pape and the records of this company before and since this department was inaugurated amply prove that such a unit is to be desired in every corporation of this kind. Mr. Pape tells the story of his department together with figures to illustrate his points.

Only Three Collectors Needed

"During the three years that our collection department has been a separate unit of our organization, functioning independently of the other departments, several things have become evident which are worthy of consideration. In the first place, the sales volume of the San Antonio Public Service Company has more than doubled since the year of 1918. Yet in handling this increase with its subsequent percentage of bad accounts through our department, we have made no additions to our force of collectors, there being three men employed in this work.

"Now in order to arrive at an idea of how the collection department is functioning, here is a list of the charge-offs on bad accounts taken from the records for the past seven years:

1918	.28 of 1 per cent
1919	.28 of 1 per cent
1920	.28 of 1 per cent
1921	.21 of 1 per cent
1922	.25 of 1 per cent
1923	.20 of 1 per cent
1924	.28 of 1 per cent
1925	.23 of 1 per cent

"In the collection of bad accounts, or probable uncollectable accounts, we have shown a little improvement, as can be seen by the records given for the past seven years, which is as follows:

1918	7 per cent
1919	15 per cent
1920	15 per cent
1921	11.9 per cent
1922	12.2 per cent
1923	16.2 per cent
1924	17.6 per cent
1925	16.4 per cent

Deposit Had to Be Increased

"As soon as the collection department was made a separate unit unto itself with a new organization of workers, we had more time to go into the cause of some of these bad accounts and to devise remedies for them. For example, after we had been functioning a short time we found that we were losing quite a number of accounts through transients. Investigation showed that the deposit of $5.00 which we required on all such accounts was hardly sufficient in many cases to cover the amount of the bill. To eliminate this we raised the deposit to $10 for all accounts where the applicant rented furnished rooms, houses or apartments.

"Another thing which became evident was the enormous amount of checks returned to us marked "nsf." A careful study of this condition and its causes showed us that many customers would pay their bills with checks, knowing that they had insufficient funds to cover the order, but taking this means to save the discount on their bill. We have practically eliminated this practise by making it a

rule that any customer giving a bad check in payment for their bill forfeits their discount.

"These are but two of the problems which we worked out to better advantage by having a collection department. There are, however, many others if they could be recalled offhand. Previous to the time that our collection department was opened these accounts were handled in the bookkeeping department and while every effort was made to keep the collections on par, we believe much more has been accomplished during the past three heretofore.

"In addition to doing away with the evils of the department, we have also created changes in the management and handling of accounts which have proven of material benefit to the customer as well as the company. The fact that this has been accomplished through the efforts of the collection department has given us quite a little prestige as well as good-will.

Concessions to Old Customers

"One of these changes was the eliminating of the deposits on all accounts of more than five year's standing, whether the client was an individual or a business house. To do this we made up a list of all such customers and then carefully checked their past records to determine their credit risk. If their account showed them to be reliable customers paying their accounts promptly, we placed them on our "Honor Roll," refunding their deposit and, in other words, taking their promise to pay their bill. This proved very popular and we received many compliments for our sincerity of purpose and faith in our customers.

"The company was benefitted in that interest had to be figured and paid on these deposits each year and the doing away with a large percentage of these deposits materially decreased the labor in this respect. In addition to the five-year deposits, we also eliminated any people who had purchased homes or who were buying them on monthly payments. This, too, decreased the labor in our accounting department as well as pleasing those affected.

"In the matter of making collections, following up bad accounts and charging off supposedly uncollectable accounts, we have made an intensive study and we believe that we have worked out a system which is as effective as could be desired. Of course, we shall constantly improve it as time goes on, but at the present time we are well satisfied.

Collectors' Reports

"As soon as a bad account comes to our attention we turn it over to one of our collectors for a personal call. Each of the three collectors is given a number of calls to make each day and a record is kept of those calls each is to make. On the return on these men to the office that night, each is required to account for each call handed him. If one takes out thirty reports, he must account for the thirty. He must turn in payment, make a report of his findings if payment is not made, or, if he is unable to get around to all of the places, he must turn in those reports not completed that day.

"Our purpose in requiring this is to keep in constant touch with each account. It was made necessary by the carelessness of one or two men tossing unreported accounts into a drawer of their desk for later attention. These reports would be forgotten and if a cut-out order was issued it often created disagreeable circumstances.

"Now those reports not accounted for each night are immediately checked up. Those not completed are given out the following morning, while those which have been lost or mislaid are duplicated. This keeps every old account before us at all times and we can determine the progress made on each account at a moment's notice.

"In order to stimulate interest in the collecting of these accounts and to prevent further measures and unpleasantness, we are working out a plan whereby we will pay a sort of bonus to the collectors on these tardy accounts. We believe that his additional incentive will create greater personal effort on the part of the collector and thus close up many accounts more promptly and with less effort.

"Those accounts which pass the stage of the collector are, of course, more difficult to handle. We find that the majority of accounts lost are due to people moving out and leaving no trace of their destination. We have had instances where a family would move from one part of the city to another, giving the wife's maiden name at the latter address in making out the application for new service.

Assistance From Collectors' Association

"This work requires vigorous and at the same time delicate action. Such accounts are sometimes located through a collector's association which we have in this city. This association is in the form of weekly luncheon club and has regular meetings. At these meetings the names of persons for whom the collectors are looking are read off and each in turn reports if they have any information of these people. In this way we are often able to locate such families. Such reports, however, are done in code in order to conform with the State law regarding the advertising of a person's obligations.

"Should this fail, we take the accounts before a meeting of the Retail Credit Men's Association where it is possible one of the members knows of the family and can give information on them. Should this fail, we place the name with the credit department of the Retail Merchant's Association. Very often through this follow-up system we are able to trace the travels of a party from one place to another, and we have even encountered instances where we have followed a party all over the United States before finally receiving a money order for the account.

"While such action is regrettable, it is often required to get results and to keep the percentage of uncollectable accounts down to a minimum. It is fortunate, however, that there are not a great many of them, and it is more pleasant transactions which often shows the public that the collection department is not as hard as they are wont to believe.

"We have a great many people who visit our office in person or who call up on the telephone and make frank statements of their circumstances. Such people are only too glad to show every consideration, and we encourage them to confide in us to the fullest extent. We have no desire to work a hardship on any one and as long as we have some assurance that we will be paid for the service which we render, we are more than willing to meet these people halfway and help them out of their difficulties.

Handling "Insufficient Funds" Checks

"For example a lady gives us a check which is returned because of insufficient funds. We get in touch with her and learn that she has made an error in her account. She informs us that she will be unable to make the check good at the time but gives us an approximate date on which she will take it up. Under such circumstances we have something definite to work upon and we are able to render every assistance.

"We have cases of sickness, lack of employment and other reverses which arise in everyday life, and we are willing to do our part in helping the unfortunate ones over these hard times. However, we cannot forget that our service is what we sell and that from the revenue derived we attain the funds to carry on. So, as long as we have some definite assurance we can cooperate. But in cases where there is an effort to commit fraud, we feel justified in taking immediate steps to get our money.

"Having this department segregated from the others permits us to handle many of these cases personally and with some degree of privacy. In this way we are often able to arrive at conclusions which otherwise might not be possible. We are enjoying a personal contact with the people to whom we are rendering a highly important service. We are able to meet them in person, to converse with them, to learn of their petty grievances, and to smooth out little misunderstandings and disgruntled feelings which are not borne until bills mount up.

"The personal contact eliminates many hard feelings and provides an opportunity for explaining both sides of a situation. We are able to meet these people on a common ground, to appeal to their sense of fairness, and to let them glimpse our side as well as their own. Many times little disputes are settled here in a friendly manner which otherwise might reach considerable proportions. It is a part of the day's work.

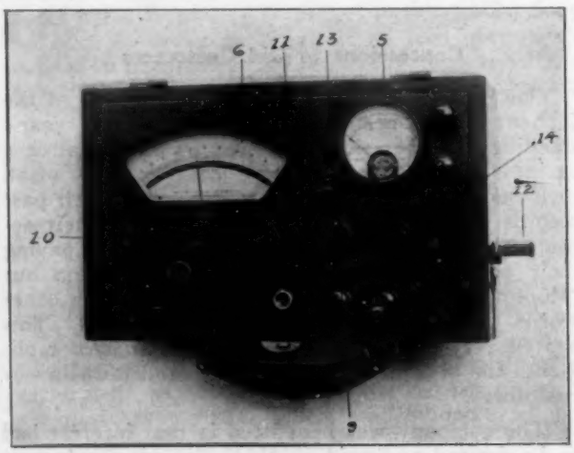
"There are so many advantages in having the collection department a separate unit from the remaining organization that the point is hardly worthy of debate. It has one of the hardest tasks in the entire chain: the smoothing out of difficulties under extenuating circumstances, the pleasing of the customer, and at the same time getting the money. It's a whale of a job."

The points brought out by Mr. Pape give evidence of the worthiness of such a department and at the same time bring out many features which other departments may adopt with considerable benefit.

Measuring Destructive Earth Currents

By Burton McCollum and K. H. Logan,
Electrical Engineers, Bureau of Standards

ENGINEERS engaged in electrolysis research work have long felt the need of a definite and accurate means of determining both the polarity of pipes with respect to earth and the current density in the earth at any point, especially in the immediate vicinity of pipes under investigation. Realizing the vital importance of meeting this need, the Bureau of



The earth current meter. Milliammeter, 5; *voltmeter,* 6; *commutator switch,* 9; *short circuiting switch,* 10; *voltmeter switch,* 11; *commutator cranks,* 12; *ammeter switch,* 13; *resistance switch,* 14.

Standards has conducted an extensive research on the measurement of intensity of current discharge from pipes to earth. This research has resulted in the development of an instrument known as the earth-current meter, which meets in a satisfactory degree the requirements of a practical instrument. The instrument has now been in use for several years by a number of consulting and utility engineers, and its reliability and usefulness have been demonstrated under a variety of field conditions.

Function of Earth-Current Meter

The earth-current meter is designed for the measurement of soil resistivity and of current density in the earth. These measurements permit the calculation of the density of the current discharge from structures buried in direct contact with the

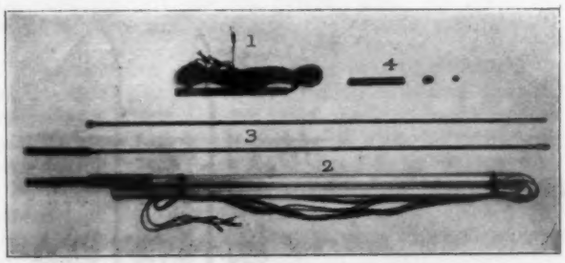
---

A concise summary of Technologic Paper 351, Bureau of Standards, entitled, "Practical Applications of the Earth-Current Meter." Engineers interested should also secure Technologic Paper 355, "Electrolysis Testing," by the same authors.

earth. The discharge at the surface of cable sheaths in ducts can not be determined on account of the effects of the ducts. For determining whether the rate of discharge of current from a point where a pipe failure has occurred is sufficient to account for rapid corrosion, the instrument has proven particularly valuable, and this use of the instrument is so simple that anyone familiar with electrical instruments can secure the desired data.

A broader application of the earth-current meter is the determination of the adequacy of or the need for electrolysis mitigation. In such cases the instrument is used to determine the rate of discharge of current and hence the rate of electrolytic corrosion at such points as other methods of testing and the relations of the underground structures indicate to be the points of greatest hazard.

In such cases the earth-current meter is not intended to supplant the older methods of testing, but to furnish more specific and reliable data at critical points, the importance of which justifies the additional labor and expense which its use involves. The determination of the locations which may yield the most valuable data requires the exercise of judgment based largely on experience. It is for this reason rather than because of any complication or delicacy of the instrument that it is recommended that the determination of electrolysis conditions be assigned to some one of considerable practical experience in electrolysis testing and in the interpretation of the data so obtained.



Contactors for earth current tests. French type, 1; *cantilever type,* 2; *single terminal electrode with extension rod,* 3; *as assembled,* 4.

The density of current flowing between two points in a homogeneous soil can be calculated from the earth resistivity and the voltage gradient between the points. The earth-current meter is based upon this principle, although in its operation neither the resistivity nor the true potential drop need be determined.

Description and Use of Apparatus

The apparatus for measuring soil resistivity and potential drops in the earth adjacent to a pipe includes a set of four electrodes to be placed in the soil and the earth-current meter consisting of a voltmeter, ammeter, double commutator battery and adjustable resistances. The contactor (set of electrodes) is placed against the wall of the trench, as shown in

Use of trench contactor

the figure, on a line extending radially from the pipe in whichever direction it is desired to measure the leakage current. The switch 9 is turned to the point marked "Commutator" and the rheostats 14, 13 and 11 adjusted to give suitable readings on the ammeter and voltmeter. The crank 12 is then turned at a rate of one or two revolutions per second. This crank rotates two synchronous commutators; one in series with the voltmeter and the potential electrodes of the contactor, the other in series with the ammeter, battery and current electrodes in the earth. This eliminates the effect that stray currents in the earth would have on the voltmeter and permits the determination of the soil resistivity. The switch 11 is next turned to the position marked "Potential" and the deflection of the voltmeter which will then respond only to earth currents observed over a period of one or more street-car cycles. The current flowing to or from the pipe is then computed from the formula $i = \frac{R\ Ee\ I}{Ec}$ where i is the current at the surface of the pipe in milliamperes per square foot. R is a constant depending on the size of the pipe, I the current supplied by the earth current meter and Ee and Ec the two readings of the voltmeter.

For the use of cantilever type of contactor, designed to be placed down in a small hole as shown in one of the figures, the value of R to be used depends on the size of the hole and also whether the hole contains water sufficient to immerse the contactor. In use the electrodes should either be entirely above the water line or completely immersed.

Use of cantilever contactor

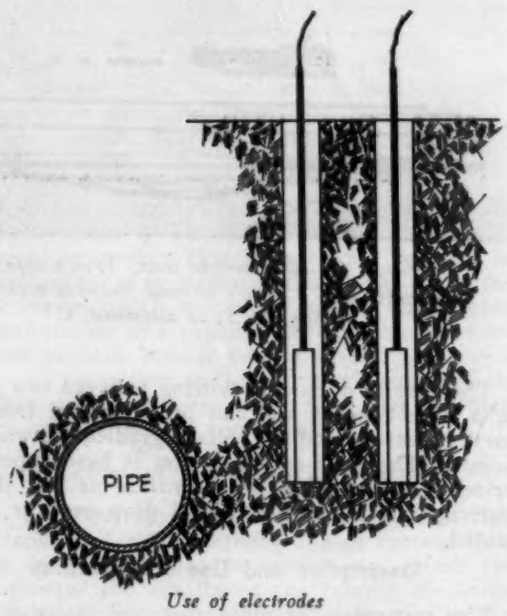
A hole about 2½ inches in diameter is commonly used. If the cantilever contactor is used for determining the vertical discharge from a pipe, the hole should be over the center of the pipe, otherwise only the vertical component of the radial discharge will be measured.

Influence of Rails and Pipes

Experience shows this measurment of the current density in a vertical direction upward from the pipe to be sufficient when the tested pipe is several feet from other conductors, and in such cases the type B contactor placed in a 2½-inch hole affords a simple and inexpensive mode of procedure. If, however, a pipe parallels a railway line and is close to the rails but a little to one side, experience shows that the discharge will be so badly biased by the close proximity of the rail that a measurement of current density in a vertical direction will not be representative of the actual flow from the pipe. The same statement applies to the case of a pipe paralleling another nearby pipe or cable system. In these cases the only accurate means of determining the current discharge around the pipe is to make an observation in six or eight different directions around the pipe.

Where it is desired to measure the current flow in a lateral direction, as, for example, the current discharge from one pipe to another, this can be done by driving two holes in the region midway between the two pipes and to a depth about equal to the depth of the pipes. There is then put in each one of these holes a type C nonpolarizable electrode, as shown in the figure. The electrodes are placed in contact with the bottom of the holes and the leads from them are connected to the binding posts P_1 and P_2 The reading of the voltmeter is then taken. The electrodes are then removed from the holes and the four-terminal cantilever contactor is placed in either hole and the two readings, corresponding to Ic and Ec in the procedure described above, are taken. The three values thus obtained are then substituted in an equation, and the value of i in the earth between the electrodes is calculated.

The correct manipulation of the earth-current meter and the contactor is, after the operator has obtained a little experience, a simple matter. It should be understood that the earth-current meter indicates not merely stray currents originating in the circuits of street railway lines, but the resultant of all direct currents flowing between the potential electrodes. This may include, and in some cases consists entirely of, current due to galvanic action originating either in soil conditions or the presence of two electrically different metals. Occasionally these galvanic currents are sufficient to cause such a deflection of the earth-current meter as to indicate a serious rate of corrosion. For example, under favorable circumstances it is possible to pick up with a 4½-inch contactor evidences of current flowing between a corroded and an uncorroded point on a section of a pipe providing the path of this current is long enough to include both the potential terminals of the electrode. However, the contactor picks up but a component of this current and it is not possible to compute the true galvanic current from the reading obtained. If the galvanic circuit is very short, as is often the case, the earth-current meter will be only slightly affected, if at all.



Use of electrodes

LOW-TEMPERATURE COKING OF CANADIAN COAL

The first official tests made by the Canadian Department of Mines on the low-temperature carbonization behavior of coals has been reported by R. A. Strong as a portion of the annual summary of investigations carried out during 1925. This report, recently issued by the Canadian authorities, summarizes tests made at temperatures from 400 to 600 degrees C. on Westmoreland, Pennsylvania, coal, used as a standard, and two Canadian coals of fine coking characteristic. The full report, which is available as part of Document No. 671, Mines Branch, Department of Mines, Ottawa, Canada, is summarized as follows:

"Thirty-four low-temperature carbonization tests were carried out on three coals, i. e., Westmoreland, Minto and Sydney coals. The maximum temperatures of individual runs varied from 350 to 600 degrees C. Three methods of carbonization were used, i. e., regular carbonization, carbonization in the presence of steam, and carbonization with the recirculation of the condensed gases. The fusing (coking) point of the three coals used was determined and considerable variation found to exist which corresponded with the action of the coal in the retort during carbonization. The cokes were analyzed and the results are shown in tabular form together with the analysis of samples of the coals from which the cokes were made. The densities of the cokes were determined and a comparison made with the corresponding high-temperature cokes. The gases at different temperatures of carbonization and by different methods were analyzed and the results tabulated.

"Examination of the tars was made by the standard Hempel distillation at atmospheric and reduced pressures. The fractions thus obtained were treated for removal of tar acids and bases and the remaining neutral oils were distilled in an Engler flask. Distillation ranges of both neutral oils and phenols were determined and the results are given as curves and are also shown in appended tables. Special examination of the tars was made to determine whether they came strictly within the definition of primary tar as outlined by Dr. Fischer, his tests being applied to both tars obtained at 500 and 600 degrees C.

Conclusions

"(1) The three coals tested yielded cokes of different quality. Minto coke obtained by carbonization at 600 degrees C. could not be considered a commercial product owing to its porosity and friability. On the other hand, Westmoreland and Sydney coals yielded at 600 degrees C. a dense coke which closely resembled the high-temperature product. Carbonization at 350 degrees C. (of Westmoreland coal) did not produce the results which have been claimed. At this temperature the yield of products was negligible, the resulting coke being smoky and still possessing coking properties.

"(2) The gas yield by low-tempeerature carbonization was low. At 400 degrees C. the yield was approximately 1,000 cubic feet, at 500 degrees C. the yield increased to approximately 2,600 cubic feet, and at 600 degrees C. a yield of about 3,600 cubic feet was obtained.

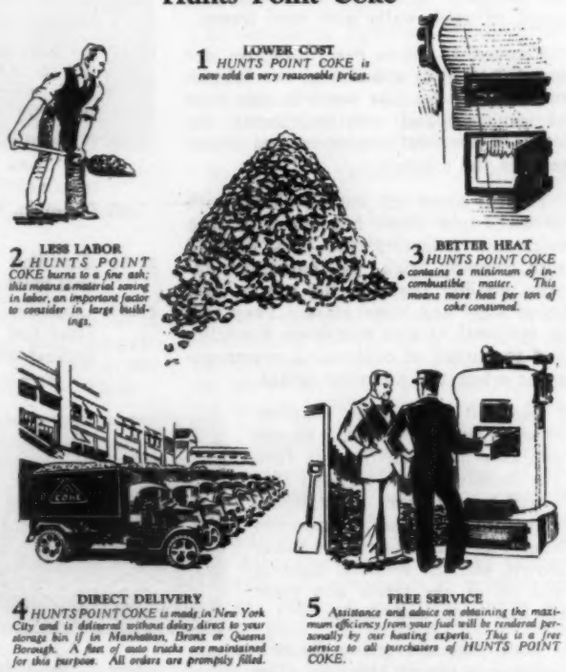
"(3) The plotted results of the distillation of the neutral oils from the three coals carbonized at 600 degrees C. showed very uniform results, which bears out the contention that neutral oils from bituminous coals are similar.

"(4) Carbonization with steam and with the circulation of the condensed gases yielded approximately similar tar oil results. The tars produced by these methods possessed a higher density and they contained a smaller percentage of the lighter oils with correspondingly higher quantities of the heavier fractions. At the lower temperatures the tar yield was apparently increased by steam and gas, but at 600 degrees C. the yield was approximately the same.

"(5) The tests as suggested by Fischer to determine whether a tar is a true primary product do not apply to tars from all coals, as the tar obtained from Westmoreland coal carbonized at 500 degrees C., although soluble in ethyl ether, was not completely soluble in petroleum ether. This tar, as well as that obtained at 600 degrees C., conformed, however, to the remainder of the tests as outlined by Fischer."

IS YOUR COKE MOVING SATISFACTORILY?

Five Reasons Why It Pays to Use Hunts Point Coke


1 LOWER COST
HUNTS POINT COKE is now sold at very reasonable prices.
2 LESS LABOR
HUNTS POINT COKE burns to a fine ash; this means a material saving in labor, an important factor to consider in large buildings.
3 BETTER HEAT
HUNTS POINT COKE contains a minimum of incombustible matter. This means more heat per ton of coke consumed.
4 DIRECT DELIVERY
HUNTS POINT COKE is made in New York City and is delivered without delay direct to your storage bin if in Manhattan, Bronx or Queens Borough. A fleet of auto trucks are maintained for this purpose. All orders are promptly filled.
5 FREE SERVICE
Assistance and advice on obtaining the maximum efficiency from your fuel will be rendered personally by our heating experts. This is a free service to all purchasers of HUNTS POINT COKE.

Much of the success in marketing gas coke depends upon the proper publicity.

The above newspaper ad shows how the Consolidated Gas Company of New York stimulates the sale of good gas coke.

Association Activities

A. G. A. and affiliated gas associations' sectional activities and convention calendar

A. G. A. Testing Laboratory's New Home

The appliance testing activities now being carried on in the present building in Cleveland occupied by the American Gas Association Testing Laboratory will soon be conducted in the new permanent home of the Laboratory, which will be situated on East 62nd Street, about 200 feet from the present site. The new building will be erected on land now belonging to the East Ohio Gas Company, which generously donated the present building and a great deal of equipment. Through the interest of R. W. Gallagher, president of the East Ohio Gas Company, and chairman of the laboratory managing committee, this company has given splendid support to every laboratory activity.

The laboratory's new home will cost approximately $150,000 to erect complete, and it will be so constructed and outfitted as to give the greatest possible utility to the testing activities of the gas industry. It will be absolutely fireproof, of brick walls with steel frame.

Planned to serve every purpose demanded of such a building, the laboratory will be the last word in this type of structure and will incorporate the ideas of the best engineers and architects in the country.

Present plans call for a building with an office-type front finished with face brick and a factory-type back finished with common brick. All partitions, except possibly those in the offices, will be of steel and clear glass. They will be sectional to give maximum flexibility and to permit of economical rearrangement when the necessity arises.

Gas will be used to heat the building and refrigeration service will also be given by this fuel. The building is so situated that it will benefit from a maximum of natural light, as is apparent from the architects' drawing shown, and the artificial lighting will be of the latest and most efficient type and design.

Total cost of erecting the new building is put at $150,000. The land is to be bought, sidewalks and driveways laid, two additional 5,000 cubic feet holders built, etc. This cost also includes moving the present equipment, wiring, heating, plumbing, etc.

CONVENTION CALENDAR

February

15-16 New England Gas Association. Annual meeting, Boston, Mass.

23-24 Annual Convention, Gas Section Wisconsin Utilities Assn., Loraine Hotel, Madison, Wis.

March

13-14 Oklahoma Utilities Association. Annual meeting, Tulsa, Okla.

14-15 Illinois Gas Association. Annual meeting, Springfield, Ill.

April

5-6 Eastern States Gas Conference, Newark, N. J.

12-13 Women's Section, Empire State Gas & Electric Association. Annual meeting, New York City.

17-19 Southern Gas Association. Annual meeting, Jacksonville, Fla.

18-20 Midwest Gas Association. Annual meeting. Lincoln, Neb. Headquarters, Cornhusker Hotel.

May

3-5 Southwest Public Service Ass'n. Annual meeting, Dallas, Tex.

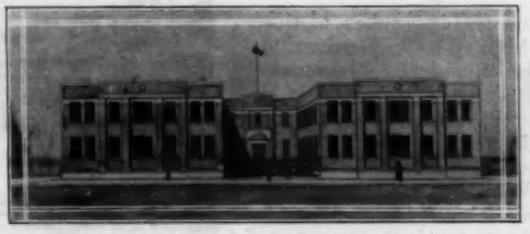
10-11 Accounting Section, Empire State Gas & Electric Asociation. Annual meeting, Briarcliff Lodge, Briarcliff Manor, N. Y.

6-11 Natural Gas Department, American Gas Association. Annual meeting, Texas State Fair Grounds, Dallas, Tex.

June

21-22 Canadian Gas Associated. Annual meeting, Hamilton, Ont.

28-29 Commercial Section, Empire State Gas & Electric Association. Annual meeting, Utica, N. Y.



New A. G. A. testing laboratory

The outside dimensions of the new building are 101 feet by 130 feet. The gross square feet of floor space is as follows:

	Sq. Ft.
Basement	3,600
First floor	11,500
Second floor	11,500
Gross Area	26,600

The floor space will be divided approximately as follows:

	Sq. Ft.
Office	3,200
Testing	14,700
Storage	8,700

The necessity for a new laboratory was brought out in the report of a special committee appointed for such purpose by the executive board. The board approved the report and decided that since the testing laboratory had already demonstrated its value to the gas industry, it was imperative to erect a new building so that the work would not suffer from lack of suitable space.

The splendid support given the laboratory by gas companies and manufacturers has resulted in a tremendous growth of activity. At the present time several of the testing departments are badly crowded, and additional space is only available by constructing a new building, which is absolutely necessary for the efficient functioning of the various testing programs.

In addition to conducting approval tests on four major types of gas appliances, the laboratory is completing investigations necessary in the preparation of new requirements and the revsion of old ones, and is also conducting exhaustive researches on the mixing of various kinds of gases. The result is that the present facilities have been taxed to the utmost and all departments have been hampered.

The laboratory now occupies approximately 12,000 sq. ft. floor space. Estimates place 20,000 sq. ft. as the necessary amount in 1930, and the present building is being planned to care for this growth. Provision has been made in the new building to allow for almost unlimited expansion. It will be possible to build additions to the sides of the building, and in so doing keep all testing work as near the ground floor as possible.

As of December 31, 1927, the laboratory had approved, either from inspection or test, 7,198 models of gas appliances. This figure reveals the splendid

work done during the past two years and a half, but it tells only part of the story. It is estimated that there are probably more than 40,000 additional models of gas appliances yet to be tested.

The committee which recommended that a new laboratory be built consisted of the following:

James Lawrence, chairman; R. W. Gallagher, O. H. Fogg, W. C. Beckjord, R. R. Young, J. S. De Hart, Jr., H. E. McGowen and H. M. Brundage.

Annual Mid-Year Meeting New Jersey Gas Association

THE New Jersey Gas Association held its mid-year meeting on Wednesday, January 25th, at the Stacy-Trent Hotel, Newark, N. J.

Two important features in connection with this meeting were very noticeable. The first was that they took in 107 new members, which makes the total membership of this association 925. Of this total 753 are active members and the balance are divided up in gas company members, manufacturing company members and association members.

The second feature was that over 400 of the membership attended this meeting, which shows the intense interest of the membership in the activities of the association.

Mr. J. L. Conover, president, presided and the meeting was addressed by the Hon. A. Harry Moore, governor of the state of New Jersey, and when it was learned that Mr. Moore had served nine years in the gas industry in the state of New Jersey, he was elected an honorary member of the association.

An interesting feature of the program was a playlet entitled, "Service to Satisfy," put on under the auspices of Miss Ada Bessie Swann. It depicted the trials and tribulations of the service department of the gas company who came in contact with customers who have imaginary grievances. It was so well done that Miss Swann should be persuaded to repeat this playlet, with her group of actors and actresses, all of whom were employees of the company, at other conventions.

Mr. Alexander Forward, managing director of the A. G. A., addressed the gathering on the progress the association is making along various lines of research, and after listening to his talk it is hard to visualize the tremendous amount of work that is being done through the activities of the association for the advancement of the gas industry.

J. L. Conover
President, New Jersey Gas Association

RATES AND THE SALE OF GAS

This paper, presented by J. P. Leinroth, general industrial fuel representative, Public Service Electric and Gas Company, brought out that while total gas sales have increased, this has been largely due to increases in commercial and industrial business.

He stated that domestic sales per meter have in general not increased and in many cases there has been an actual decrease. Changing living conditions as reflected in the buying of cooked foods from delicatessen stores, the week-end motor trip, the increase in the number of apartment houses, rather than competition from other fuels, have materially aided in bringing about this condition.

These facts must be faced squarely, said Mr. Leinroth, and "it is becoming increasingly evident that if we are to make progress in face of these facts, we must throw some of our traditions to the winds." In this regard he declared that the gas industry is entering a highly competitive era, wherein gas must be sold to the consumer on the basis of the advantages that will compensate for the higher fuel price.

Appreciation of the competitive aspect of this business at once brings up the rate question, he declared. "Unless we can offer rates," continued Mr. Leinroth, "which are really commensurate with the cost of serving, we are going to continue to deprive ourselves of a great deal of business which we ought to have on our lines. It is clear that rates low enough to attract the maximum of business cannot be put into effect as long as two-thirds of our customers do not yield a fair return to the company.

"The solution obviously lies in offering rates that tend to make all customers pay a fair return to the company, so that rates can be offered to get competitive business."

He suggested a remedy by way of introducing a fixed charge element in domestic customer rates, either in the nature of a service charge or a modification, such as a relatively high charge for the first few hundred cubic feet. However, the charge for this first increment should not be so high as regards the amount of gas to be used that the next step cannot be made low enough to attract business. "Generally speaking, the public does not take kindly to fixed charges, and for that reason a rate including the fixed charge in the first one or two hundred cubic feet is more popular than a straightforward service charge rate."

In discussing turnover, Mr. Leinroth said, "it is the job of the new business department to not only sell gas, but to encourage the use of gas for such purposes as will increase the load factor and thus turn over the capital more quickly."

Referring to allocation of costs of taking on certain classes of business with reference to additional investment required, Mr. Leinroth stated:

"Spare capacity must not be considered a reason for not entering an investment charge in the usual case. While no additional investment is needed at the moment, due to this spare capacity, yet the taking on of the additional load, if any part of it falls on the present peak, eats into the reserve capacity and will necessitate additional capacity just so much sooner. In the building of the rate the additional investment must be determined from a study of the load characteristics of the load in question with particular reference to the amount of additional investment as represented as that required over and above the present peak. If, however, for one reason or another, the company has so much spare capacity that it cannot look forward to such a future load as will completely utilize this spare capacity, then it may, of course, be good policy to formulate the rate on another basis. But such cases are rare."

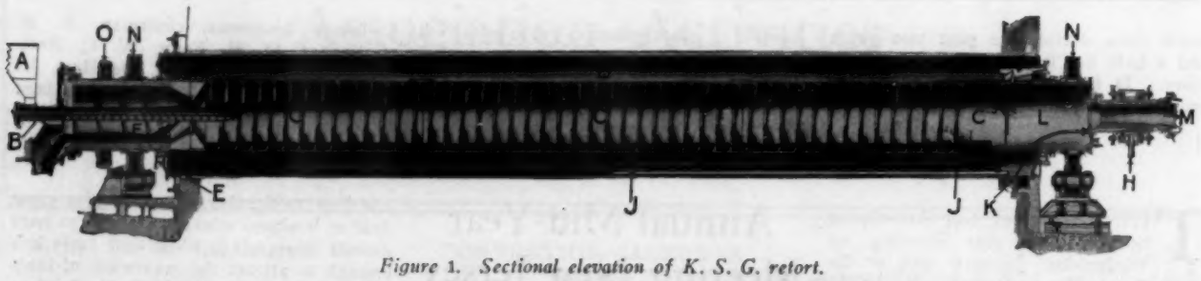


Figure 1. Sectional elevation of K. S. G. retort.

RECENT DEVELOPMENTS IN LOW TEMPERATURE COAL CARBONIZATION

In this paper Mr. H. D. Savage, of the International Combustion Engineering Corporation, dwelt upon the K. S. G. System, which is to be installed in New Brunswick to furnish gas for the Public Service of New Jersey.

The following are the principal achievements claimed for the K. S. G. process, which is being installed for the first time in the United States at the New Brunswick location.

1. Low-grade fuels and mine waste have been converted into valuable commercial products.

2. Means have been found for utilizing a wide variety of bituminous coking coals.

3. Heat transfer has been accelerated by the use of steel drums, and the carbonizing time is much shorter than that required by brick retorts.

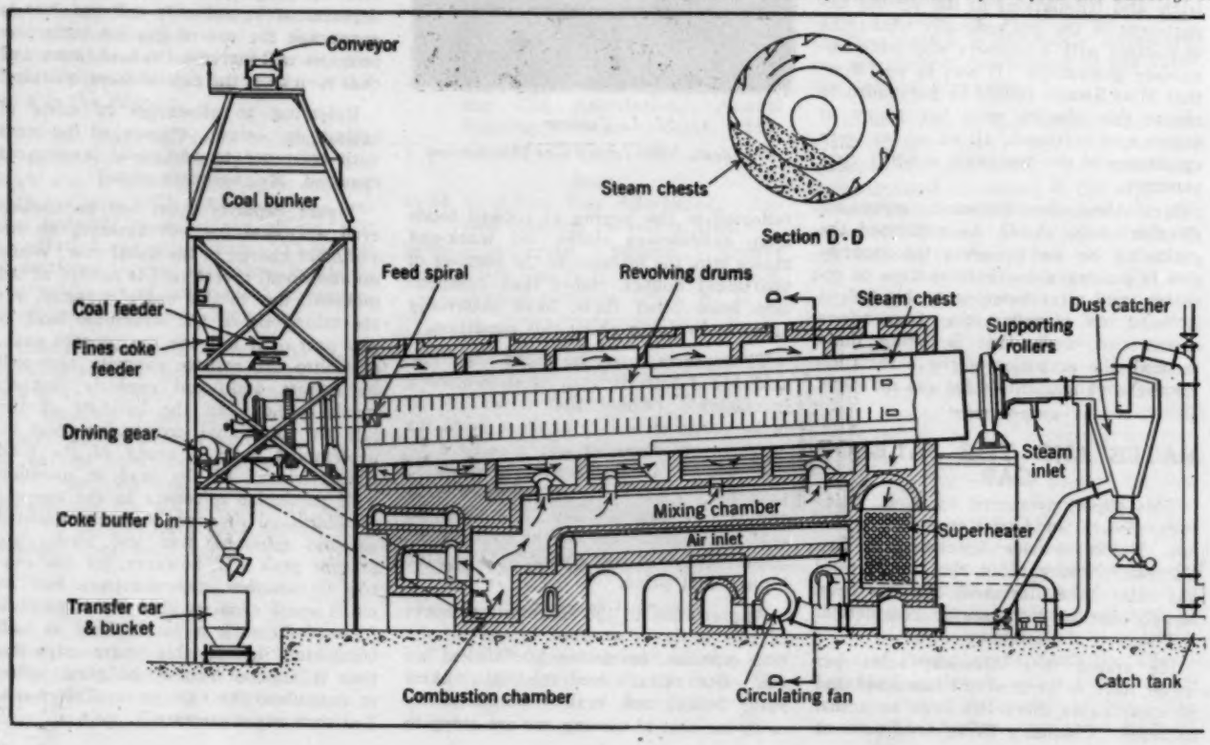
4. Investment costs have been lowered by the employment of a relatively few number of large carbonizing units.

5. The heat necessary for carbonization has been decreased by discharging all products at low temperatures.

6. Maintenance charges have been kept low by simple, rugged construction.

7. Labor costs have been reduced to a minimum by adopting the method of continuous, automatic operation.

Figure 2. View of K. S. G. retort from feed and discharge end



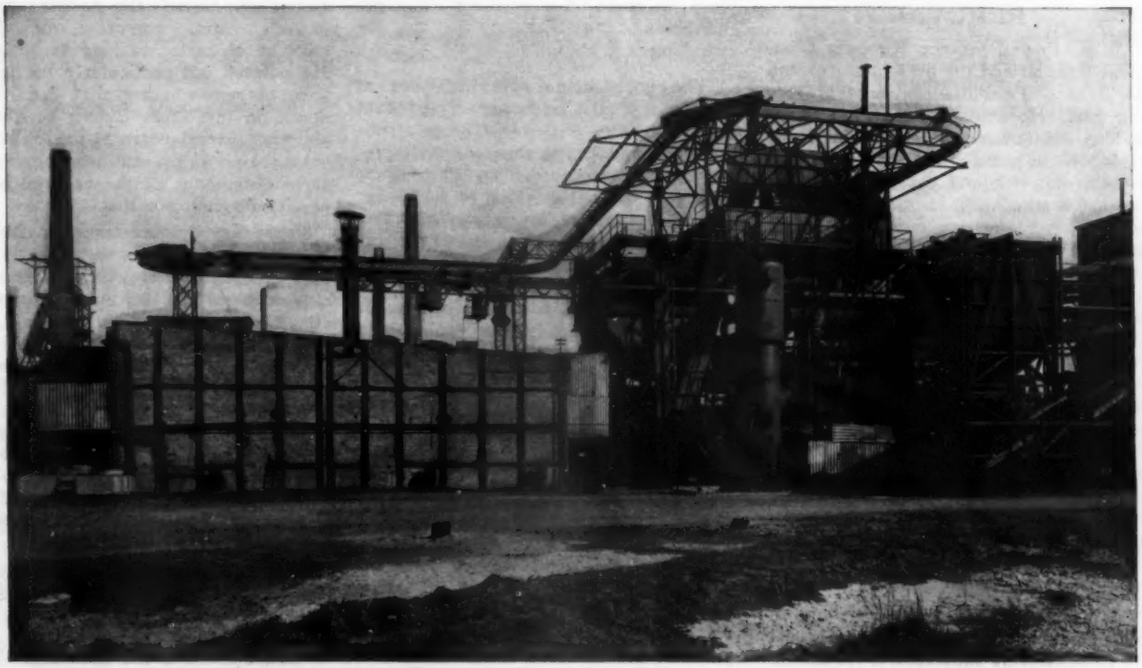
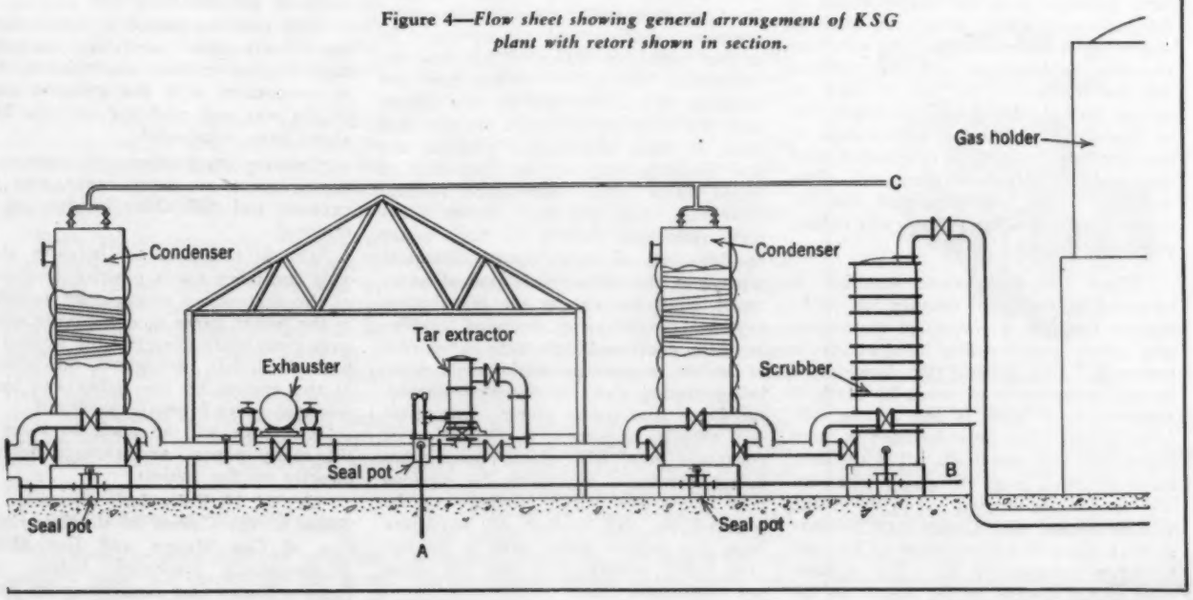


Figure 3. General view of K. S. G. plant. The cylinder to the right of the center is part of the dry-quenching apparatus

Figure 4—*Flow sheet showing general arrangement of KSG plant with retort shown in section.*



NAPHTHALENE AND GUM REMOVAL

A. R. Powell, of the Koppers Company, summarized the present status and importance of naphthalene removal from city gas. He explained that, "If naphthalene did not have a strong tendency to deposit in gas distribution systems as a solid material, and cause serious and expensive stoppages, there would be no necessity for removing it from manufactured gas. Although the actual amount of naphthalene present in gas is very small in relation to the other constituents of gas, almost all manufactured gas contains naphthalene in excess of that which the gas can carry through the distribution system. The logical place to remove naphthalene from gas down to a quantity where it will remain fixed in the gas is at the plant before the gas is sent out. This, of course, requires no argument, since it is poor economy and disastrous to cordial customer relationship to permit the colder portions of the distribution system to act as naphthalene condensers.

"The naphthalene scrubber to be used must have certain definite characteristics to be entirely satisfactory. It should be capable of handling large or small volumes of gas as desired. It should have no cumbersome moving parts. The labor requirements should be nil. The ground space required should be small. The heating value of the gas must not be reduced. The back pressure should be low. The total cost of materials, maintenance and operation must be small per thousand cubic feet of gas treated.

"Under practical conditions with the Koppers scrubber the loss in heating value of the gas is not detectable. The back pressure is in the neighborhood of 2.0 inches of water, when the plant is operating at full capacity. The scrubber removes naphthalene and also reduces the tar content of the gas to such an extent that increased back pressure, due to deposition of tar and naphthalene in the purifying boxes is eliminated, and the oxide efficiency is increased. The decreased back pressure and the increased oxide efficiency both will reduce purification costs.

"When the naphthalene scrubber is operated in the usual manner for naphthalene removal, a portion of the indene and other gum-forming compounds is removed. As a general rule, however, a larger quantity of oil must be used, if elimination of gum is one of the objects sought. Oil must be used in such a quantity that practically all of the drip oil is absorbed from the gas, so that the oily condensate coming out in the mains will be almost nil. Under such circumstances there is no objection to the use of large volumes of oil. The volume used would always be far under the oil requirement for enrichment purposes. Since the spent oil is used for water-gas enrichment, the cost of the oil for scrubbing is nothing."

"The naphthalene scrubber built at the plant of the Seaboard By-Product Coke Company is the first large scrubber built, and has been successfully removing naphthalene from 25 million cubic feet of coal gas per 24 hours for a period of about 2½ years. At this plant the naphthalene content of the gas is reduced to 4 grains per 100 cubic feet by the use of only 16.5 gallons of gas oil per million cubic feet. However, it is very easy to bring the naphthalene content much lower than this simply by increasing the amount of fresh oil supplied.

"Operating debits against the naphthalene scrubber consist of the following items, gas oil for scrubbing, labor, power and steam for heating in cold weather. The spent oil produced serves as a credit, which at least balances the fresh oil used. From figures obtained over a long period, the net operating costs at the Seaboard plant show 0.018 cent per thousand cubic feet. Costs of operation for the other installations are in line with this very low figure. Due to low installation costs, fixed charges are also reasonable. That naphthalene scrubbing pays can be easily shown by balancing against the cost of scrubbing the gas the total service costs and repairs due to naphthalene stoppage trouble."

GAS DEHYDRATION

The possibilities of gas dehydration were stressed by G. A. Bragg, who outlined the three methods available—compression, cooling and absorption. In urging further attention to this new development, he said: "When you are thinking of gas dehydration you cannot help but be impressed with the fact that most of these distribution troubles are due fundamentally to the presence of liquid water in the distribution system. Corrosion, drip pumping, frozen services, stoppages caused by rust, meter troubles, all of these nearly disappear when you prevent condensation of water vapor from the gas in the distribution system. Naphthalene stoppage troubles are also decreased, for there is no film of water to prevent naphthalene from being carried away by the first unsaturated gas that comes along. Intangible but equally important is the value of consumer good will which comes from better service. Estimates by various men place the direct savings to be realized by dehydration at anywhere from one to four cents, most of the figures being between 1½ and 2½ cents per 1,000 cubic feet."

In discussing European practice, Mr. Bragg emphasized the possible dangers of aggravating corrosion difficulty if calcium chloride washing is practiced. He pointed out particularly the importance of remembering that definite evidence on this score cannot be obtained short of several years of use on a plant scale. Hence, he cautioned against too early acceptance of the apparently successful English practice.

Regarding the economic possibilities, he explained the costs as follows: "The cost of dehydration will vary considerably with the method employed and the conditions of any particular plant. An average figure for a moderate sized plant —5,000 M. per day—would be one and a half cents divided nearly evenly between operating and fixed charges. This is for dehydration by direct cooling with refrigerated water. Dehydration by absorption with a non-corrosive solution will be cheaper, probably one and one-quarter cents, most of the decreased cost being due to lower capital charges. Dehydration by compression, if the whole cost of compression is charged against dehydration, may easily total four cents per thousand.

"Dehydration is the next logical step for the progressive gas man in the improvement of the quality of his product and his service to his customers. It will save more than it costs."

DISCUSSION BY W. GRIFFIN GRIBBEL

In discussing the above paper Mr. Gribbel spoke as follows on the general subject of Dehydration as Affecting Meters.

"Ever since the gradual elimination of candle power standards some fifteen years ago, a marked change in the character of gas has occurred.

"The troubles caused by labor shortage, inadequate purifying materials, high sulphur content, naphthalene, etc., in connection with the stripped gases of the war and post-war periods, have about been eliminated.

"One serious problem still remains in the presence of water vapor, and the expense and difficulties incident to its removal.

"The literature of the industry since 1923 furnishes much positive testimony of the destruction wrought by moisture in the leaner gases now in vogue which have completely absorbed the protecting film of oil left throughout the interior of the system by the richer and more wasteful gases formerly produced.

"Reference will be made to some of the many papers and reports bearing directly on the subject.

"Mr. W. H. Fulweiler's discussion on 'Some of the Causes of the Deterioration of Gas Meters and Gas Meter Diaphragms,' presented before the Eastern States Gas Conference on April

12, 1923, shows rather conclusively that iron in combination with sulphur and moisture is responsible for the brittleness and failure of diaphragm lambskin.

Origin of Damaging Iron

"In conjunction with the discussion on 'Deposits in Mains, Services and Meters' before the same body by Mr. J. E. Brewer, in Philadelphia in April, 1927, there remains small doubt but that much of the iron undermining the structure of diaphragm leather originated in oxide form in the corrosion occasioned by water vapor in the system, travelled miles in oxide form and combining with sulphur compounds took sulphate form and finally penetrated the leather as shown in Mr. Fulweiler's photo-micrographs in the discussion of 1923.

"Mr. Parker's article on 'Purification' in the May 11, 1927, issue of the London Gas Journal, on page 861, confirms the testimony of one of our leading American engineers, Mr. Kunberger of the United Gas Improvement Company, that the mastery of naphthalene troubles has served to identify more clearly the magnitude of the losses occasioned by corrosion of iron and steel in mains, services and meters caused by water vapor in the presence of oxygen, cyanogen, carbon-dioxide, hydrogen-sulphide and other compounds.

"The present increasing formation of scale and rust is an acknowledged fact and the strides made by works apparatus manufacturers here and abroad in anticipation of a coming demand reflects the seriousness of the situation.

"Gas engineers of the country now agree that formerly the presence of rich hydro-carbons acted as a vehicle, carrying the gum-forming constituents producing the gums which have given so much trouble during the increasing vogue for leaner and less wasteful gases in recent years.

"They seem to further agree that the correction of the trouble can be accomplished by scrubbing with gas oil and in the dehydration of the finished gas.

"Here again arises the menace of iron relative to diaphragms. While it has been shown that iron attacked by sulphur compounds produced destructive action in the diaphragms, the iron in these same resultant salts acted as a catalyst in gum formation. It would seem reasonable, therefore, to suppose that the removal of water vapor, thus cutting down the formation of iron salts and acids, would serve a double purpose.

Bad Effects of Water Vapor

"An overwhelming majority of meter troubles today are ascribed to the presence of water vapor. The report of the Meter Bureau of the Technical Section, Pacific Coast Gas Association, in August, 1925, realizing its limitations does, however, venture the following:

"'While it is not the purpose of this report to say just how gas should be made, it has been found impossible to avoid treating certain requirements of manufacture if a reasonable lengthening of life is to be expected from a meter diaphragm or a definite solution is to be found for premature diaphragm deterioration. There is no doubt of the tremendous advantage of gas free from moisture, as under this condition the sulphur compounds in the gas are prevented from forming H^2SO^4, which is the agency causing premature deterioration. The presence of sulphuric acid can be proven by titration of gas drippage; also by long bubbling passage of gas free from sulphurated hydrogen; by precipitating sulphur from same as barium-sulphate; also, and absolutely by presence of green crystals of iron sulphate (copperas) in the mains.

"'Reference may be made to the article on "Corrosion of Gas Mains," by W. V. Watson, page 715, of the Proceedings of the Pacific Gas Association, Vol. 15, 1924.

"'Sulphur compounds of a dry nature in the gas are absolutely harmless and will do no more injury than so much talcum powder.

"'It seems to the committee that the question of chemical deterioration is a problem which should be given urgent attention by gas engineers as the meter maker and repair shop man exercise a control over mechanical impurifications only. They have practically no control over chemical deterioration of diaphragms!'"

Effect of High Pressure

"The report then goes on to instance the fact that meters coming from high pressure systems show less of the difficulty. The inference is obvious.

"This same committee in its conclusion leads off with the suggestion that the great superiority of moisture-free gas be seriously considered if diaphragm life is to be reasonably maintained.

"This committee possibly acting in ignorance of Mr. Fulweiler's discussion in 1923, and certainly in ignorance of Mr. Brewer's discussion in 1927, has substantially confirmed both conclusions under conditions separated by the widest dimension of our geography.

"The American Gas Association has awarded the 1926 Beal Medal to Frederick W. Sperr, Jr., director of research for the Koppers Company of Pittsburgh, Pa. This is the second award of the same medal earned by Mr. Sperr's contributions, hence we can safely assume his utterances carry considerable authority.

"'Dehydration of Manufactured Gas' deals exhaustively with every phase of the situation, confirming and extending previous discussions of the subject. His summary leaves little unsaid and is as clear as crystal.

"The punishment dealt to the meter manufacturer by moist gas goes farther than that absorbed by the rest of the system in the destruction of the diaphragm through the brittling influence of iron salts and the disturbing gums catalyzed by the iron in the salts formed by its combination with sulphur compounds. These gums are bad enough anywhere in the system, but at the delicately adjusted valves of a meter they are particularly ruinous.

"Mr. Sperr's reference to the desirability of fog lubrication under any condition has a particular importance in relation to diaphragm life.

"Ever since the troublesome days of the war and the post-war period the manufacturers of gas meters have been thrown back on their haunches by meter difficulties formerly unknown. A consistent and untiring search is being made for materials and dressings that will resist the reactions above referred to.

"It is difficult and it is exceedingly bad taste for a meter manufacturer to criticize the practices of the industry, other than constructively. We are offering constructive criticism in unreservedly seconding the findings of competent chemists and gas engineers of distinction in asking that the question of dehydration be solved in consonance with the splendid progress of the industry."

Progressive Chain Stores
Use Gas for Heating
Successful merchants provide for the comfort of their customers. Gas steam radiators give a clean, constant heat. Prepare now for the winter.
Telephone: TRiangle 7500
The Brooklyn Union Gas Company
Mail This Coupon Today
HELP THE RED CROSS JOIN IN BROOKLYN
Are you getting your share?

MANUFACTURERS' SECTION OF A. G. A. PROPOSES TO REORGANIZE

The American Gas Association has done a great deal of extremely constructive work in the past few years. However, a large portion of the work has been directed more or less to help the gas companies, and has not pertained primarily to the welfare of the other important branch of the industry—the companies manufacturing appliances and equipment. With no idea of interfering in the slightest with the splendid work being done for the gas companies engaged in selling gas service, but rather with the aim of pulling together the various interests that constitute the industry as a whole, that all may benefit thereby, the Manufacturers' Section of the American Gas Association has determined to become a more active and valuable group than it has up to this time.

At a recent meeting of the Manufacturers' Section, held in New York, there was proposed a plan which, if carried through to a successful conclusion, will undoubtedly tie the various manufacturers much closer to the A. G. A., and hence to the industry, than previously, and would also give the manufacturers a more complete conception of the gas companies' interests and requirements.

The plan calls for the organization of a conference composed of delegates from each group of manufacturers engaged in the same line of business. The chairman of the Manufacturers' Section of the A. G. A. will call the delegates together not less than four times a year, and as many more times as may be expedient. It is proposed that the conferences be held at any points in the country which may be selected. They will be under the auspices of the Manufacturers' Section of the American Gas Association, and the chairman of the section will preside. Any paper work, reports or other necessary data can be compiled either by the Manufacturers' Section or by outside agencies, as may seem best. These delegates to the conference will represent their specific group, which in turn will be made up of manufacturing companies in each line, such as range manufacturers, meter manufacturers, etc. The chairman of the Manufacturers' Section will select a chairman of each of the groups which are not at present organized, and these men will organize their groups for the selection and instruction of delegates to the conferences. In this way each group will have the privilege of selecting its own delegates.

It is suggested that when the manufacturers in a certain group have made a selection of their delegates, one of these delegates be chosen as a chairman, and these delegates who represent their group should come prepared to discuss at the conference such matters pertaining to the industry as a whole in which their group may be particularly interested, and in addition to take part in any subject that may come before the conference.

Inasmuch as the Managing Committee of the Gas Manufacturers' Section is the party under whose auspices these conferences will be held, the personnel of this Managing Committee will be members of the conference ex-officio and the general conduct of the conferences will be held under its jurisdiction and, as stated above, presided over by its chairman.

Leading men interested in the gas industry will address the companies on subjects of common interest. It is felt that to bring together men who will necessarily be leaders in their various groups into one meeting and to consider the various aspects of the industry together, the position of the manufacturers in the industry will undoubtedly be strengthened and that the results of such deliberations will come before the executive board of the American Gas Association with a much stronger backing than such problems have been presented in the past.

Requests for the selection of delegates will be sent out just as soon as details can be arranged, and, with the support of all, the Manufacturers' Section feels that a great deal can be accomplished.

New Coking Process

A new coking process is described by G. L. Montgomery in the article published in Chemical and Metallurgical Engineering, November, 1927, pages 618-9. The coke is made from coal that has been crushed to the size of a pea. The coal is moved from the crusher to a bucket elevator which raises it to the charging level of a preheater. The preheating of the coal constitutes the first step in the carbonization process. After the coal has been preheated it is discharged from the preheater into what is known as the preheated coal bin. This bin is then lifted to the top of the coking chamber and charged into this apparatus. The coking ovens are of the horizontal recuperative type. They are fired with producer gas and are provided with the usual motor-operated pusher for discharging the coke.

The discharged coke passes to the quenching station where it is sprayed with water. The gas passes through the purification plant, which consists of combined coolers, condensers and scrubbers. The gas is cooled and metered while the tar and liquor, recovered from it, are sent to storage tanks.

The essential feature of the process consists in preheating the coal. This takes place in an apparatus in which an entrance temperature of 450 to 500 degrees C. is maintained in the inflowing gases and a temperature of 150 degrees C. in the outflowing gases. The temperature of the preheated coal is 300 degrees C. The preheater looks like a cement or rotary kiln.

Book Review

Pyrometry. By William P. Wood and James M. Cork. 207 pages. Published by McGraw-Hill Book Company, Inc., New York. Price, $3.00.

The pyrometer is a much neglected tool in modern gas works practice. Part of the neglect has often been due to trials of good instruments under conditions or with procedure that did not permit effective use. With this volume available explaining the fundamental physics and good industrial practice there is no longer any excuse for neglect of high-temperature measurements on the score of lack of available information. The book is well prepared not only for the use of the man relatively inexperienced in this field, but it is also adequate to answer most of the questions of the experienced investigator dealing with the important fundamental mathematics of high temperature phenomena and high temperature measurements.

Noxious Gases. By Yandell Henderson and Howard W. Haggard. 220 pages. Published by Chemical Catalog Company, Inc., New York. Price, $4.50.

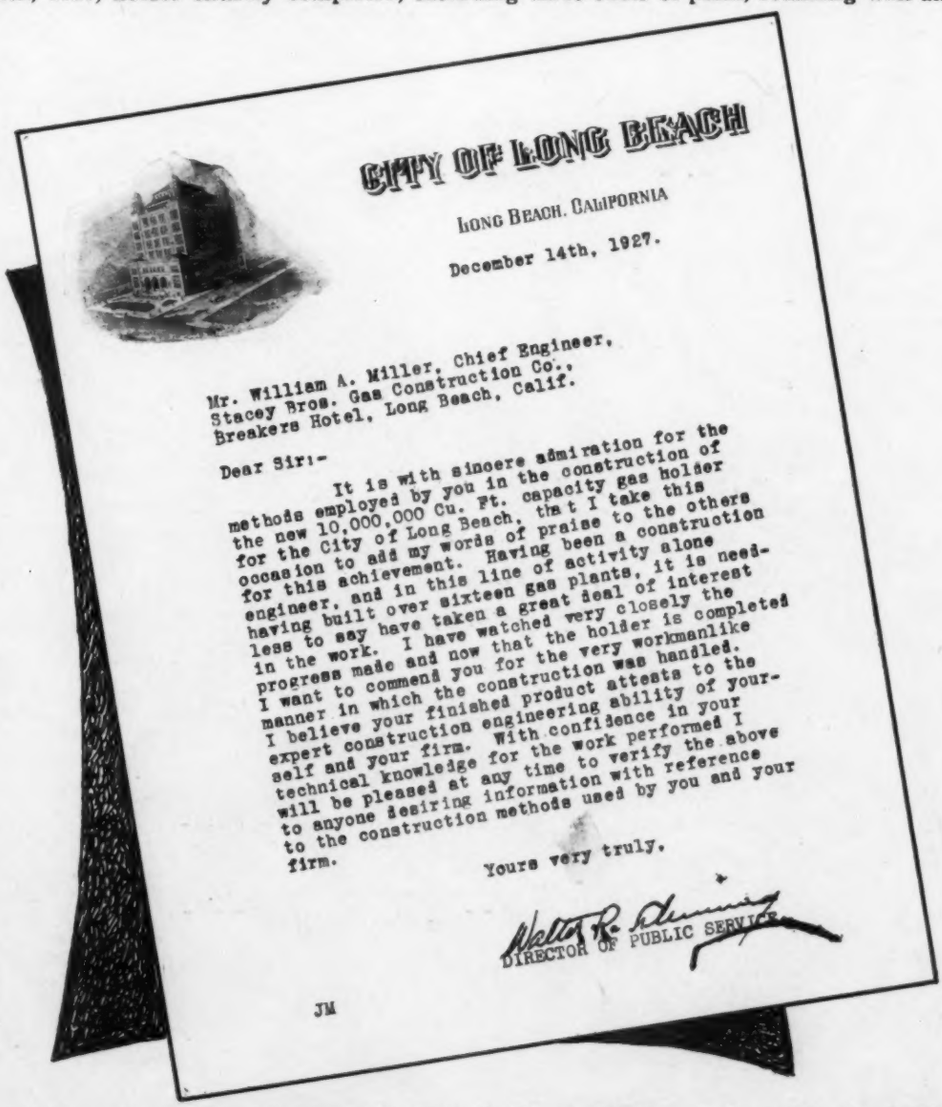
Executives and safety department workers requiring authoritative information on gas poisoning will find this volume a valuable and convenient reference book. It deals with a great variety of industrial hazards, but there is a considerable portion of the work relating specifically to physiological aspects of carbon monoxide poisoning and such related subjects as concern welfare and safety workers in the manufactured gas business.

We Were Given Eight Months
But We Finished in Seven

Our contract called for the completion of the 10,000,000 cu. ft. gas holder for Long Beach, California in eight months. IT WAS FINISHED AND GAS TURNED ON IN SEVEN MONTHS.

Contract Awarded—May 5, 1927.
Excavation commenced—May 6, 1927.
Excavation completed—May 28, 1927.
Erection of Steelwork begun—June 13, 1927.
Erection of Steelwork Finished—November 28, 1927.

December 6th, 1927, holder entirely completed, including three coats of paint, retaining wall and back fill.



CITY OF LONG BEACH

LONG BEACH, CALIFORNIA

December 14th, 1927.

Mr. William A. Miller, Chief Engineer,
Stacey Bros. Gas Construction Co.,
Breakers Hotel, Long Beach, Calif.

Dear Sir:-

It is with sincere admiration for the methods employed by you in the construction of the new 10,000,000 Cu. Ft. capacity gas holder for the City of Long Beach, that I take this occasion to add my words of praise to the others for this achievement. Having been a construction engineer, and in this line of activity alone having built over sixteen gas plants, it is needless to say have taken a great deal of interest in the work. I have watched very closely the progress made and now that the holder is completed I want to commend you for the very workmanlike manner in which the construction was handled. I believe your finished product attests to the expert construction engineering ability of yourself and your firm. With confidence in your technical knowledge for the work performed I will be pleased at any time to verify the above to anyone desiring information with reference to the construction methods used by you and your firm.

Yours very truly,

Walter R. Stevens
DIRECTOR OF PUBLIC SERVICE

JM

The remarkable part of this achievement is that all the steelwork was brought over 3,000 miles from the fabricating plant in Cincinnati, Ohio. Truly a supreme test of our

"ABILITY TO SERVE"

STACEY BROTHERS GAS CONSTRUCTION CO.

NEW YORK: 350 Madison Ave. CINCINNATI, OHIO BOSTON: Eastern Service Co.

THE KOMPAK CO.

Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK
NEW JERSEY

Solid Tires on a Packard

Not only out of date, but ridiculous. No more so, however, than the sale of a galvanized iron storage system in a fine home, with beautiful plumbing fixtures and all brass pipes.

Kompak All Copper Storage systems are not high priced. They simply give the better house the kind of heater that should be installed. By all means, put in the cheaper galvanized system where the owner *wants* it, but first give him the chance to buy the best:

The "Kompak" and "Brunswick"
All Copper Storage Systems.

THE KOMPAK COMPANY,

NEW BRUNSWICK, N. J.

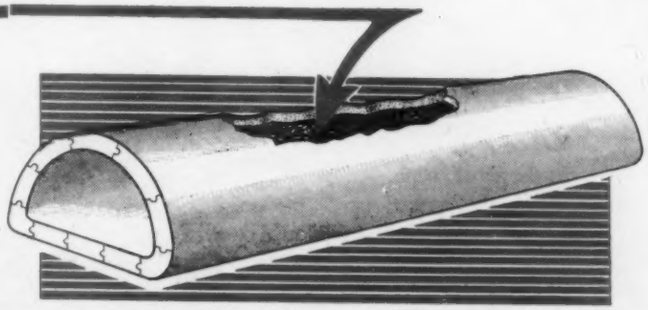
KOMPAK

It "couldn't be done!" —so they DID IT with

IGNISITE

(Reg. U. S. Pat. Off.)

"A jagged hole suddenly appeared along the crown of a retort in one of our benches. *The hole measured two feet wide by over six feet long.*



"It looked as if we'd have to shut down the whole bench and put in a new retort.

"Lucky thing we had a drum of IGNISITE on hand which we had been using for patching cracks and repairing brickwork.

"To avoid a shut-down, we filled the entire break while the retort was hot, forcing chunks of IGNISITE in place with a long paddle.

"While average repairs with other materials had never exceeded six weeks, this major repair LASTED OVER SIX MONTHS."

How about your own refractory linings in Gas Sets, Benches, Boiler Settings, etc.? Get ready for emergency repairs. A Drum of IGNISITE may save a Ton of Trouble. Us it for new construction, too.

THE M. W. KELLOGG CO., Inc.

9 DEY STREET (*Refractories Division*) NEW YORK

IGNISITE was developed by experts in the use of refractory cements after years of practical service tests. Strictly uniform in grade, easy to mix and handle, sets at normal temperatures, gives long service. When properly used there is no shrinkage. Gives a perfect surface seal at 1200° to 1400° F.

Packed in steel air-tight drums of convenient size from 200 to 800 lbs.

Send this Coupon

The M. W. Kellogg Co., Inc. (Refractories Division),
9 Dey Street, New York.

Send literature on IGNISITE and tell me how it is used for construction and maintenance in

[ ] Gas Benches [ ] Oil and Water Gas Sets
[ ] Coke Ovens [ ] Gas Fired Furnaces
[ ] Boiler Settings [ ] Bonding Fire Brick

Name .....
Position .....
Company .....
Address .....

Southwestern Ring used with lead—(1) Jute; (2) Southwestern Ring; (3) Lead.

Southwestern Ring used with cement—(1) Jute; (2) Southwestern Ring; (3) Cement; (4) Jute; (5) Cement.

Southwestern Rings Make Tight Gas Joints

SOUTHWESTERN Rings of Paranite "C" compound make a gas-tight joint in bell-and-spigot pipe. This ring is specially designed by experienced gas engineers to make it easy to use and doubly efficient. This Southwestern Ring conforms to the irregularities of the pipe, jute and lead (or cement) under the pressure of calking. It is now being used in gas main construction in all parts of the country, both for artificial and natural gas.

Southwestern Ring Is Self-Healing

When calked into a bell-and-spigot gas joint and sealed by lead or cement from the oxygen of the air, the ingredients of the gas cause this ring to swell and thereby "self-heal" any pin hole leaks that might be left after calking. We caution against the use of any ring not containing special self-healing rubber compound.

Write for Literature, Prices and Complete Information on joint materials for new work and repair work.

Ask For Sample

The Southwestern Ring is being used either with braided jute and lead (cold strips or poured), or with jute and cement.

We are glad to send you sample rings for test purposes.

Southwestern Pipe Joint & Engineering Company

1108-1110 5th Avenue, North,

Birmingham, Alabama

(Factories Passaic, N. J.)

Technical and General MISCELLANY for The Busy Gas Man

EQUIPMENT RECORD SYSTEM

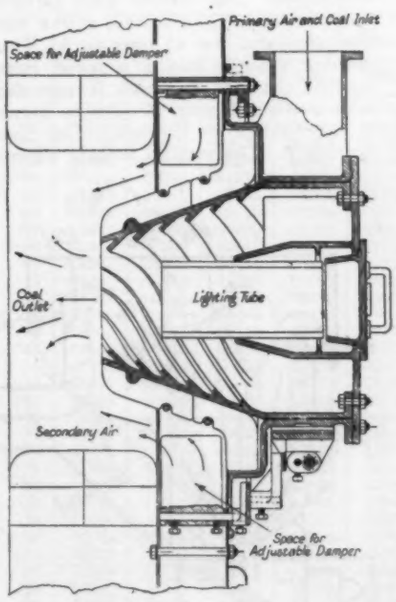
An interesting article, written by J. Thompson, is published in Industrial Engineering, 1927, pages 415 ff. This article describes in considerable detail, with illustrations of various forms and the like, an equipment record system which is employed in a large steel foundry for the purpose of keeping a careful record of equipment parts and supplies used in the plant. It is stated that in as much as the steel foundry undoubtedly requires a system of this sort of the maximum complication, the system described will be applicable to every industry, at most after certain minor changes have been made in it.

The system is based on the use of record cards on which there is given complete information regarding the character of the equipment, the location of the equipment in the building, the building number, the estimated life, depreciation, etc. Any requisition that is made for repairing this equipment after installation is then made to tie up with the equipment register. On approval of repairs a complete bill of materials is made. A record of drawings made is also kept. Various other forms are used to record progess of work and the like and they all constitute a complete record of the equipment and any work done on it.

IMPROVEMENT IN PULVERIZED FUEL FIRING

An improvement in pulverized fuel firing is shown in the accompanying illustration which is claimed to solve the problem of flame length. Complete combustion is attained in ten feet only, instead of about thirty feet as at present. At the same time up to 150,000,000 B.t.u., about five to six tons of coal or four tons of oil per hour is taken by a single unit with a very low air pressure.

About fifteen per cent of the total volume of the air, at only two inches water pressure, is supplied direct round the center of the burner, along with all the coal by means of a concentric casing, while eighty-five per cent of the total volume as secondary air enters into another concentric casing at one inch water pressure behind the first casing. This secondary air is given a violent cyclonic motion in addition to that of the primary air and fuel, by means of spiral ribs, so that separation of air and coal particles at the burner tip is impossible, irrespective of what happens in the primary air circuit on the way.



The only adjustment is a single slide damper on the secondary air supply line. When once set, no further control is required to give complete combustion, although many turbulent burners have been largely dependent upon the personal skill of the operator. The Chemical Age (London), 1927, page 572.

EQUATIONS FOR PIPES

A series of constants have been derived, which are shown in the tabulation below, based on the fact that the carrying capacity of a pipe varies in accordance with the square root of the fifth power of the diameter for a given length and friction loss. These contants can then be employed in determining the equivalent of a series of pipes. Thus, suppose it was necessary to determine the diameter of a pipe which is equivalent in carrying capacity to pipes of one inch diameter, one and one-quarter inch diameted and one and one-half inch diameter.

The proper constants are obtained from the following tabulation and are added together as follows: 0.538 + 1.18 + 1.82 = 3.54. Then the nearest constant to the value 3.54 is located in the same tabulation and this is seen to be 3.728. The constant which is more than 3.54 is the one selected. This constant then corresponds to a pipe diameter of two inches.

Diameter of Pipe Inch	Constant
0.5	0.1162
0.75	0.2627
1	0.5376
1.25	1.178
1.5	1.829
2	3.728
2.5	6.118
3	11.21
3.5	16.74
4	23.71
5	43.81
6	71.65
8	149.8
10	160.2

J. L. Bixby, in National Engineer, 1927, pages 306 ff.

EXPANSION OF STEAM PIPES

The gas engineer is often called upon to calculate the expansion of steam pipes in order to take proper care of this factor in designing piping systems. Generally the formulae are involved and difficult to apply, and hence the one that is given below will be interesting. The formula reads as follows: Expansion of the pipe in inches = C (T_s — T_a) L. In this formula C is the coefficient of expansion for the metal in question, T_s is the temperature of steam in degrees F (which is found by adding the superheat temperature to the value found from the steam tables opposite the steam pressure), T_a is the temperature of air, and L is the length of the steam pipe in inches. The value of C is generally 1/150000. It is found that cast iron pipes will expand three-quarters of an inch for each hundred feet length for every 100 degrees F. rise in temperature, provided that the pipe is well covered. The expansion in a steel pipe under the same conditions will be 0.82 inch. For further details the reader is referred to the article in Domestic Engineering (London), 1927, page 164.

NEW METHOD OF DETERMINING NAPHTHALENE IN GAS

The principal difficulty in determining naphthalene is the tendency of the substance to pass directly from the gaseous to the solid state on cooling. It is thus deposited in the tubes, etc., leading to the testing apparatus when the temperature of these tubes is less than the saturation temperature of the gas.

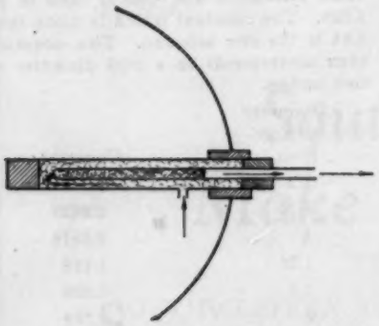


Fig. No. 1

The new method consists in cooling the gas to zero degree C. (at that temperature the vapor tension of naphthalene below 760 millimeters may be considered as nil). All the crystallized naphthalene is collected on a filter and the proportion is determined after cognizance is taken of the state of equilibrium of a ternary system: water-acetic acid-naphthalene.

The method of sampling the gas is important. (Fig. No. 1.) The accompanying figure shows the device used for this purpose. It consists of a glass tube, 30 to 40 centimeters long and 15 centimeters diameter, with a hole in the side. This tube is closed at the interior end and has a one hole cork at the outer end as shown. It sticks through the gas pipe. A smaller bore tube, 7 to 8 millimeters diameter, is inserted in the large glass tube. The lower end of this tube is perforated and the space between the two tubes is filled with glass wool as shown.

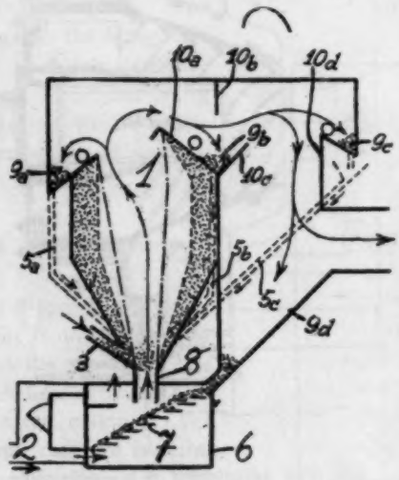
Fig. No. 2

The hook-up of the entire apparatus is shown in the accompanying illustration (Fig. No. 2). The gas first passes through the small flask, which is a drying flask, and the major portion of the water content of the gas is precipitated in this flask. It then passes into the refrigerating bottle maintained at a temperature of zero degree C. The naphthalene is condensed in that bottle. The gas then passes through the meter where it is measured.

In weighing the naphthalene all of this substance contained in the drying flask, the refrigerating flask, etc., is collected and filtered. The naphthalene is then dissolved in hot acetic acid. The content of water in the naphthalene is determined by the solubility of the substance in the acid. The quantity of naphthalene is read off a suitable table. M. J. Bonte, Journal des Usines a Gaz, 1927, pages 483-5.

DISTILLING COAL DUST IN CURRENT OF GAS

The apparatus which is used for this purpose is shown in the accompanying illustration. The vertical shaft furnace is shown at 1. The bottom of the vertical apparatus has an opening 8. This opening extends into a widened combustion chamber 6, which is provided with a stepped grate 7. Air is blown in under this grate through the air duct opening 2. The vertical furnace widens

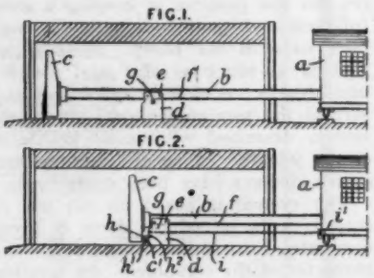


out gradually from the bottom, opening upwards. The inclined walls of the apparatus, as at 10a, 10b, 10c and 10d, force the current of gas which is being withdrawn from the apparatus to change its direction of travel several times. The result is that deposits of coal dust, which is carried along by the gases, are formed in the chambers 9a, 9b, and 9c. Channels at 5a, 5b and 5c conduct the deposited coal dust back again into the apparatus. 1.

The coal dust which is being converted into gas is fed into the gaseous stream at 3. The current of air, which is introduced at 2, is advantageously preheated before it is used. For this purpose a certain amount of fuel is advantageously burnt on the stepped grate 7. The coal dust which is fed into the rising current of gas at 3 is ignited and the gases of combustion are carried along upward by the gas flow. The speed of the flow of gas through the bottom opening of the generator at 8 is regulated in such a manner that the coarsest particles of coal, which are fed to the apparatus, are carried along with the gaseous flow rising from the bottom of the apparatus at 8. G. Szilka and A. Rozinek. German Patent No. 452,015.

DISCHARGING COKE OVENS

An interesting improvement in the method and means for discharging coke ovens is patented by Naamlooze Vennootschap Sikica en Ovenbouw Mij in British Patent No. 277,269. The illustration shows a travelling pusher a.



This pusher is fitted with a pusher bar b which carries a ram head c. A shoe d is slidably mounted on the bar b. As the bar bends downward during the pushing operation this shoe grounds upon and thus prevents contact of the head c with the floor of the oven. The shoe d is supported by rollers e engaging rails f on the bar b and is provided with additional rollers g on which the bar slides after the rails f cease, owing to sagging of the bar, to engage with the rollers e.

A modification is shown in figure 2, in which the shoe d is locked to the head of c by the engagement of one arm h^1 of a bellcrank in an eye c^1, the locking device being automatically released, when the shoe reaches the middle of the oven or thereabouts, by a rod i which is secured to the other arm h^2 of the bellcrank and provided with a lug i^1 adapted to engage a stop on the machine a.

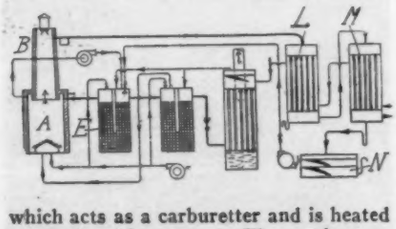
WELDING PIPES

The advantages of the use of welding piping connections in plumbing and heating installations are discussed by S. E. Beadle in Domestic Engineering (Chicago), 1927, number 5, pages 18 ff. The question of welding is gone into

at rather great length in this article, which is illustrated with numerous examples of how welds should be made. It is pointed out that the obvious advantage of welding, namely, the elimination of pipe fittings, is supplemented by other advantages, such as lower frictional resistance to the flow of the fluid in the welded pipe system as compared with the system in which fittings are employed. The costs of welding are discussed in detail. The article is filled with practical suggestions for the plumber and pipe-fitter as to how to carry out welding in domestic and industrial heating installations.

HIGH THERMAL VALUE GAS IN HYDROCARBON GAS GENERATOR

The process is concerned with the production of a high thermal value gas in a hydrocarbon gas generator by the introduction of coal tar oil precipitated in the coolers into a heat accumulator



which acts as a carburetter and is heated by the hot blast gases. The total quantity of raw gas which is produced in this manner is fed to the purification plant and the introduction of the decomposition products of the carburetting oil in the carburetting chamber takes place in the gas producer without use of the raw gas that comes from the distilling apparatus. The gases which leave the distilling or carbonizing shaft B (see accompanying illustration) are partially passed through the two coolers L and M which are connected in series. Due to the high temperature which prevails in the first cooler L only highly viscous tar is separated out in it, and in the second cooler, however, both tar oils and water are precipitated. A current of cooling water which is introduced in counter-current to the flow of the gases acts as the cooling medium. The tar oils, which are separated from their water content in the tank separator N, are then introduced into the superheater E, which acts as a carburetter. These tar oils are accordingly converted into high temperature tar and high thermal value gases. The rest of the gases which are removed from the gas generator with the aid of an exhauster enter the carburetter at the same time as the tar oils which have been freed of their water content. The mixture of gases and of tarry vapors, which leaves the carburetter, is then directly introduced into the upper portion of the water gas generator A right under the distillation shaft. Dr. R. Nuebling and R. Mezger. German Patent No. 451,608.

CAPACITY OF HORIZONTAL CYLINDRICAL TANKS

For calculating the capacity of a horizontal cylindrical tank the following formula and table will be found convenient.

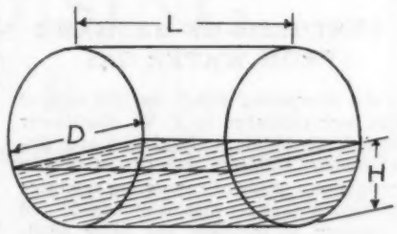
Let D equal diameter of tank in feet.

Let L equal length of tank in feet.

Let H equal height in feet of the liquid in the tank.

First calculate $\frac{H}{D}$ and find the corresponding value of O from the table given herewith.

Then the number of cubic feet in the tank = L x O x D^2.



Gallons of liquid in tank = L x O x D^2 x 7.478.

Example: A tank 4 feet in diameter and 11 feet long is filled with liquid to a depth of 16 inches.

Then $\frac{H}{D} = \frac{16}{48} = .333$, and from the table the corresponding value of O = .22886.

Hence the number of gallons = 11 x .22886 x 4 x 4 x 7.478 = 301.

H/D	Value of O.									
	·000	·001	·002	·003	·004	·005	·006	·007	·008	·009
·00	·00000	·00004	·00012	·00022	·00034	·00047	·00062	·00078	·00095	·00113
·01	·00133	·00153	·00175	·00197	·00220	·00244	·00268	·00294	·00320	·00347
·02	·00375	·00403	·00432	·00462	·00492	·00523	·00555	·00587	·00619	·00653
·03	·00687	·00721	·00756	·00791	·00827	·00864	·00901	·00938	·00976	·01015
·04	·01054	·01093	·01133	·01173	·01214	·01255	·01297	·01339	·01382	·01425
·05	·01468	·01512	·01556	·01601	·01646	·01691	·01737	·01783	·01830	·01877
·06	·01924	·01972	·02020	·02068	·02117	·02166	·02215	·02265	·02315	·02366
·07	·02417	·02468	·02520	·02571	·02624	·02676	·02729	·02782	·02836	·02889
·08	·02943	·02998	·03053	·03108	·03163	·03219	·03275	·03331	·03387	·03444
·09	·03501	·03559	·03616	·03674	·03732	·03791	·03850	·03909	·03968	·04028
·10	·04087	·04148	·04208	·04269	·04330	·04391	·04452	·04514	·04576	·04638
·11	·04701	·04763	·04826	·04889	·04953	·05016	·05080	·05145	·05209	·05274
·12	·05338	·05404	·05469	·05535	·05600	·05666	·05733	·05799	·05866	·05933
·13	·06000	·06067	·06135	·06203	·06271	·06339	·06407	·06476	·06545	·06614
·14	·06683	·06753	·06822	·06892	·06963	·07033	·07103	·07174	·07245	·07316
·15	·07387	·07459	·07531	·07603	·07675	·07747	·07819	·07892	·07965	·08038
·16	·08111	·08185	·08258	·08332	·08406	·08480	·08554	·08629	·08704	·08778
·17	·08854	·08929	·09004	·09080	·09155	·09231	·09307	·09384	·09460	·09537
·18	·09613	·09690	·09767	·09845	·09922	·10000	·10077	·10155	·10233	·10312
·19	·10390	·10469	·10547	·10626	·10705	·10784	·10864	·10943	·11023	·11102
·20	·11182	·11262	·11343	·11423	·11504	·11584	·11665	·11746	·11827	·11908
·21	·11990	·12071	·12153	·12235	·12317	·12399	·12481	·12563	·12646	·12729
·22	·12811	·12894	·12977	·13060	·13144	·13227	·13311	·13395	·13478	·13562
·23	·13646	·13731	·13815	·13900	·13984	·14069	·14154	·14239	·14324	·14409
·24	·14494	·14580	·14665	·14751	·14837	·14923	·15009	·15095	·15182	·15268
·25	·15355	·15441	·15528	·15615	·15702	·15789	·15876	·15964	·16051	·16139
·26	·16226	·16314	·16402	·16490	·16578	·16666	·16755	·16843	·16932	·17020
·27	·17109	·17198	·17287	·17376	·17465	·17554	·17644	·17733	·17823	·17912
·28	·18002	·18092	·18182	·18272	·18362	·18452	·18542	·18633	·18723	·18814
·29	·18905	·18996	·19086	·19177	·19268	·19360	·19451	·19542	·19634	·19725
·30	·19817	·19908	·20000	·20092	·20184	·20276	·20368	·20460	·20553	·20645
·31	·20738	·20830	·20923	·21015	·21108	·21201	·21294	·21387	·21480	·21573
·32	·21667	·21760	·21853	·21947	·22040	·22134	·22228	·22322	·22415	·22509
·33	·22603	·22697	·22792	·22886	·22980	·23074	·23169	·23263	·23358	·23453
·34	·23547	·23642	·23737	·23832	·23927	·24022	·24117	·24212	·24307	·24403
·35	·24498	·24593	·24689	·24784	·24880	·24976	·25071	·25167	·25263	·25359
·36	·25455	·25551	·25647	·25743	·25839	·25936	·26032	·26128	·26225	·26321
·37	·26418	·26514	·26611	·26708	·26805	·26901	·26998	·27095	·27192	·27289
·38	·27386	·27483	·27580	·27677	·27775	·27872	·27969	·28070	·28164	·28262
·39	·28359	·28457	·28554	·28652	·28750	·28847	·28945	·29043	·29141	·29239
·40	·29337	·29435	·29533	·29631	·29729	·29827	·29926	·30024	·30122	·30220
·41	·30319	·30417	·30516	·30614	·30712	·30811	·30910	·31008	·31107	·31205
·42	·31304	·31403	·31502	·31600	·31699	·31798	·31897	·31996	·32095	·32194
·43	·32293	·32392	·32491	·32590	·32689	·32788	·32887	·32987	·33086	·33185
·44	·33284	·33384	·33483	·33582	·33682	·33781	·33880	·33980	·34079	·34179
·45	·34278	·34378	·34477	·34577	·34676	·34776	·34876	·34975	·35075	·35174
·46	·35274	·35374	·35474	·35573	·35673	·35773	·35872	·35972	·36072	·36172
·47	·36272	·36371	·36471	·36571	·36671	·36771	·36871	·36971	·37071	·37170
·48	·37270	·37370	·37470	·37570	·37670	·37770	·37870	·37970	·38070	·38170
·49	·38270	·38370	·38470	·38570	·38670	·38770	·38870	·38970	·39070	·39170
·50	·39270									

For values of $\frac{H}{D}$ above ·500, see note below.

NOTE.—If $\frac{H}{D}$ comes over ·500, subtract it from unity, obtain the corresponding value of O from the table and subtract this value from ·78540. The resulting figure is the true value for O to be employed in the calculations.

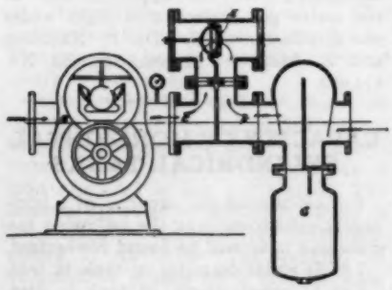
SYNTHESIS OF METHANE FROM WATER GAS

An interesting article on this subject has been published by F. W. Hightower and A. H. White in Industrial and Engineering Chemistry, pages 10 to 15. The results of a study of converting mixtures of carbon dioxide, carbon monoxide and hydrogen to methane and other products at temperatures of 280 to 370 degrees C are given. The experiments were carried out at atmospheric temperature and in the presence of a nickel catalyst. A considerable amount of methane is formed which is in agreement with other investigations. The reader is referred to the original article for details.

A NEW TAR EXTRACTOR

The operation of this tar extractor can be seen from the accompanying illustration. The principle of the operation involves passing the gas through a diaphragm of spun glass or glass wool, under a few pounds pressure. The object is not so much the filtering out of the tar as effecting the combination of the tar particles in the fog into particles that are too large to be held in suspension in the gas.

The gas from the cooler is forced by the blower B to the inlet side of the tar extractor C, and through the diaphragm E at a pressure which may be from one to five pounds per square inch. This diaphragm is composed of spun glass or glass wool, packed to a thickness of about three-eighths of an inch between two perforated steel discs held



in place by a cast iron grid on each side. These elements are bolted together and held in place against an internal flange of the separator body. The uniformly distributed layers of glass wool form a previous multitple screen against the fibers of which the gas impinges in its passage.

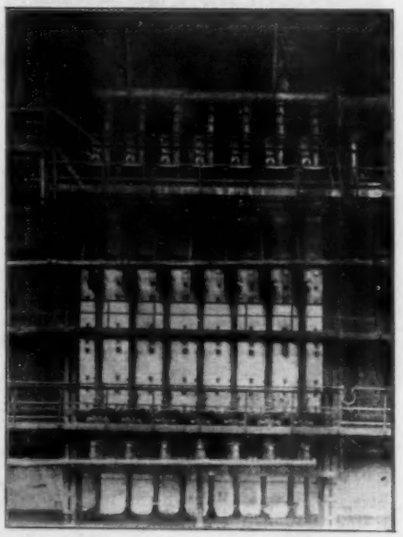
The support given by the perforated steel discs prevents distortion or displacement of the fibers of the screen, which lasts indefinitely. The screen does not act as a filter and therefore does not coke. Oil Engineering and Technology, November, 1927, pages 423-5.

VERTICAL CHAMBER OVEN WITH UPPER AND LOWER GAS TAKE-OFF

After the chamber is filled with coal and depending on the nature and fineness of the coal, a strong pressure is produced, particularly in the first stages of distillation, which results in gas losses. For this pressure will force the gas through the fine fissures and cracks in the wall of the chamber. This is partially counteracted in actual practice by maintaining a vacuum in the coolers, but the denseness of the coal cannot do away with the lower pressure, and furthermore, this practice also has the disadvantage that flue gases as well as air are sucked along with the gas, due to unavoidable leaks, and the result is that the heating value of the manufactured gas is impaired.

These disadvantages led to the idea that the best way out of the difficulty was to remove the gas as quickly as possible out of the chamber, not only at the top but also at the bottom. The illustration shows such a vertical chamber with each chamber of six tons capacity. The experiments were carried out with this apparatus. However, the results were unsuccessful, due to the fact that the coal was soft at the beginning of the distillation and hence blocked the passages through which the gas was to leave the chamber. This difficulty was counteracted by placing a cast iron box in the lower part of the chamber and connecting tubes on both long sides of the box for leading away the gases. The pipe was made with bends so as to be better able to clean it out when the occasion arose. A riser pipe is connected with this take-off and this vertical pipe is irrigated with ammonia liquor. The liquor is evaporated by coming in contact with the hot parts at the bottom of the pipe and is thus converted into a fine mist of water vapor which meets the rising gases and prevents the formation of incrustations.

At the same time the aforementioned iron box acts as a water gas generator, in that steam is introduced into the two lower gas take-off tubes, which steam is uniformly distributed over the entire chamber surface. This results in a considerably more favorable decomposition of the steam and hence a higher yield of water gas is obtained from the chambers. The commonly practiced introduction of steam through one or sev-



eral pipes possesses a disadvantage in that these pipes are easily stopped up or burnt, and can be cleaned out with difficulty only. Furthermore, the production of water gas is insufficient.

It is stated that the chambers have been operated with the lower gas take-off pipe for more than half a year, and the results have been highly satisfactory. Clogging-up of the lower pipes or of the vertical pipes has not occurred. No sort of cleansing was found necessary. The gas escaped easily through the lower take-off pipe. No pressure wass formed in the lower portion of the chamber. K. Beuthner, Das Gas und Wasserfach, 1927, page 1238.

GAS MERCHANDISING

Domestic Home Service

DEVELOPING SALES OF HOTEL AND RESTAURANT EQUIPMENT IN PLACES OTHER THAN HOTELS AND RESTAURANTS

By C. H. French, Standard Gas Equipment Corporation of New York

THE field for selling heavy duty gas equipment outside of hotels and restaurants is very large, and it is well worth the effort to all gas companies to have specially trained men to go out after this class of business.

In the past two years very notable installations have been made of heavy duty cooking appliances in many of the large banking institutions throughout the country, where the employees are served with luncheon and, in many cases, supper at night, when it is necessary for night clerks to be employed. Many of the large insurance companies and telephone companies are putting in up-to-date gas equipment for feeding their employees.

In insurance companies and banks the number of persons that are fed each day range from two hundred to thirty-five hundred employees. In some cases the institution pays the entire cost of the food, and in other cases the employees have to pay for it themselves, but at price which is practically the cost to the institution. In other words, the institution does not figure to make a profit on the food, but is satisfied if the amount of money received pays the cost of the food and the expense of cooking and serving it. In some instances the food is served by waiters employed for the purpose. Another system is that of assigning certain of the employees to act as waiters or waitresses during the luncheon period.

Lunch Schedule

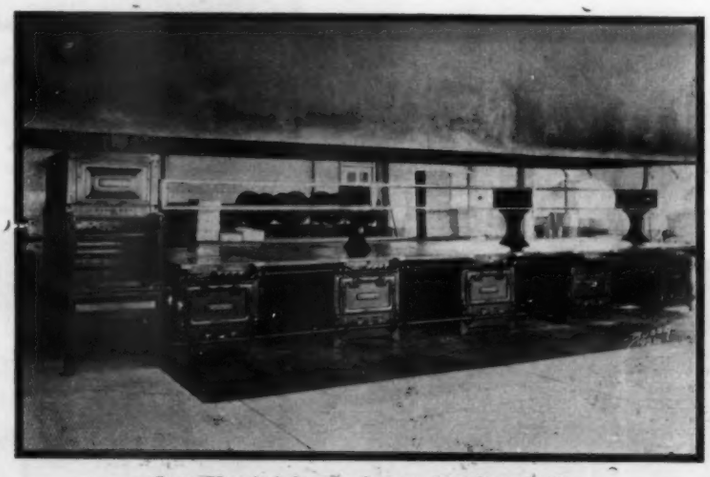
As a rule the lunch hours of the employees are so arranged that a certain number are fed at various periods, namely at 11:30, 12:00, 12:30 and 1 o'clock. As the actual time of eating is usually limited to half an hour, it is necessary that those going at the different times be seated as promptly as possible in the dining room so that they can be served in the least possible time, in order that they may eat and the tables be cleaned for those coming in for the next half hour period.

In some of the places they do not have regular waiters or waitresses, but have what is termed the self-service plan, which is similar to that used in cafeterias, where the person takes his tray, goes to the various counters and secures just the articles of food he desires, and then carries the tray to the table. In some cases they are requested when finished eating to carry the tray back with the used dishes and deposit them at a given point. In other cases the dishes are collected by someone who has been assigned to this particular duty.

The installation of heavy duty equipment in churches has become quite popular in the last few years, and some very large and elaborate kitchens have been established. These kitchens are used for preparing food for church dinners and suppers for the various organizations or societies connected with the church. In some instances these kitchens have to be equipped to feed from four hundred to one thousand people, so that the equipment that is installed is generally equal to that which would be put into a fairly good sized restaurant. Sometimes various members of the church societies are assigned to do the cooking for the function that is to be held and the means of serving the food may be done by a committee appointed as waiters or very often regular waiters are employed for the purpose. In some cases outside caterers are given the job to prepare the food which they bring to the church, preparing it and cooking it in the church kitchen. In most instances the serving of food at lodge meetings of various organizations and societies is carried on very much in the same manner as that employed by the churches.

The foregoing in a way covers pretty well the places where heavy duty equipment can be sold and to what uses heavy duty gas equipment is put.

Every gas company should be specially interested in the sale of heavy duty equipment for the reason that it increases very materially the gas consumption and is business that is very profitable and well worth securing. From experience it has been found that in order to secure this type of business it is necessary that specially trained men be employed for this specific work, and those companies that have been successful in securing this class of business are those who have specially trained men and also have a proper display of appliances connected with gas either in their show rooms or in some part of their building where prospective customers can be brought in and shown the actual demonstration of the appliances.



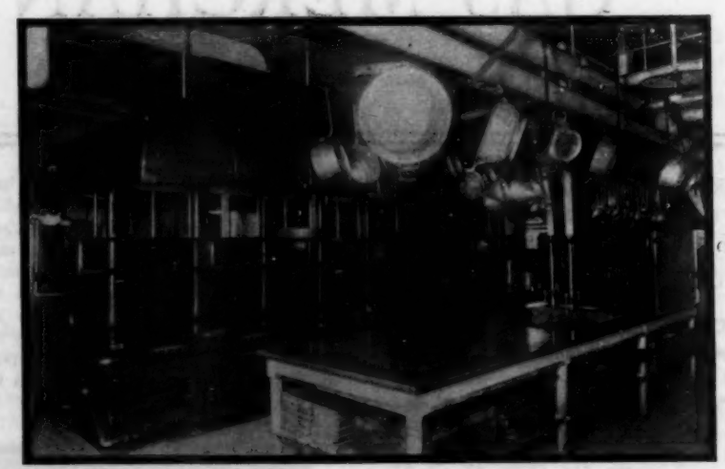
State Hospital for the Insane, Norristown, Pa.
Installed by Counties Gas and Electric Co.

The sale of heavy duty equipment is not as easy as selling the housewife for home use, and much time and thought has to be given to each individual case as to just what appliances should be installed to best meet the needs of the prospect. The salesman who is endeavoring to sell the equipment must make the prospect realize that the matter of selecting the equipment is a very serious and important thing and that details should be very carefully talked over before the final decision is made. Wher

the final decision is made as to just what appliances should be installed the salesman should be in a position to make a sketch or drawing showing the layout of the equipment and either submit the original drawing or have it blueprinted and submit a copy to the prospect with an estimate of the cost of the appliances and installation charge. The making of a sketch or drawing of the layout makes quite an impression on the prospective customer and is a big help in selling the equipment. It is a very easy matter to make a floor plan and even an elevation plan of the equipment, and each salesman who is endeavoring to sell this type of equipment should be able to make drawings of layouts, and it is well worth the time of the salesman to be in a position to make the necessary drawings.

Cooperation With Equipment Houses

It is also advisable for the gas companies to work in harmony and cooperate in every way possible with the kitchen equipment firms in their locality, especially on new jobs. Even thought the gas company is not able to secure the order for the appliances they should cooperate with those having the contract and see that proper information is given as to the installation of the proper size piping, meter, etc. There are many instances where electric, coal and oil appliances were installed where, had the gas company given full cooperation to the kitchen equipment concern, the installation would have been gas-burning appliances. If the gas companies would make a systematic survey of all their heavy duty appliance users in their territory they would find a very large number of appliances on their lines which are very antiquated and inefficient, and it has been found that a very large increase in heavy duty appliance sales has been made where the heavy duty appliance salesmen have made it their business to displace this old type equipment.



Prudential Insurance Co., Newark, N. J.
Installed by W. J. Buzzini, Inc.

In many cases the saving in gas between the old type equipment and the new installation has paid for the new appliances in a short time. The replacement of old equipment with more economical and modern types not only makes satisfied customers for the gas company but is one of the best advertising mediums for inducing customers to use more gas than heretofore, and in addition to this it has a tendency to have them advocate gas to others in the same line of business.

Federal Reserve Bank, New York City
Duparquet, Huot and Moneuse Co.

Regarding the cost of cooking with gas over other types of fuels, when everything is taken into consideration, gas is undoubtedly the cheapest fuel that can be used, as compared to the cost of electricity, coal or oil, and it also must be borne in mind that gas burning equipment does not cost any more than coal or oil appliances, and costs far less than electrical appliances. The upkeep on gas appliances is so small in comparison to other kinds of equipment that it is almost nominal.

One of the most important things is the servicing of heavy duty appliances and the gas company should periodically see that the appliances are serviced and kept in proper working order, whether the installation of the appliance was made by the gas company or a kitchen equipment firm.

(The illustrations accompanying this article depict Vulcan ranges manufactured by the Standard Gas Equipment Corporation.—Editor.)

Progressive Institutions
Use Gas for Cooking
Hospitals, Clubs, Schools, and many other organizations find the all-gas kitchen best adapted for their restaurant requirements.
Our staff of kitchen equipment experts will be pleased to serve you.
Industrial Division
Telephone: TRiangle 7500
The Brooklyn Union Gas Company
December Sale
Replace your old range with a Vulcan Smoothtop Gas Range and receive a Cash Allowance.

Advertise to Get Institutional Business

There is much business to be obtained through the installation of hotel range equipment in hospitals, clubs, banks and the like.

Assist your salesmen in procuring this business by way of timely and efficient advertising.

Justifying the Home Service Department

A straight-from-the-shoulder argument that should convince skeptics and backsliders

By Daurice F. Darling

Director Home Service Department, Boston Consolidated Gas Company

RECENTLY a prominent man when asked if his company had a Home Service Department, replied: "Oh, yes, we have all the frills and fancies here too." It is for just such gas men that the existence of Home Service must be justified, not as a "frill or fancy," but as a vital part of the gas industry. It has been said time and again, by those in favor of Home Service, that the beneficial results are intangible, that the good work of Home Service cannot be figured in dollars and cents. I wonder if these really are the facts. If necessary, and is it not often necessary, cannot the gas official be shown that the gas company has received a considerable monetary benefit through the efforts of the Home Service Department?

First of all, Home Service is a sign of progress. Let us look back only a few years, at the old time gas companies. They were commonly looked upon as a necessary evil—an industry whose livelihood was gained, it was even intimated, by robbing the public. One could search far before one could hear a good word for the local company. Is it not an admitted fact that where there is a lack of confidence on the part of the public there can be little progress? Home Service through the medium of friendly calls made on the housewife, by the Home Service Instructor, is invaluable as a means of gaining this confidence. The instructor easily secures entrance into the home where the salesman might be turned away. What does she find? In many cases a gas appliance giving very poor service. The housewife is dissatisfied. But again, there is that same idea of a necessary evil. If a Home Service Instructor by the proper adjustment of the appliance, a simple explanation and a friendly chat removes the thought of dissatisfaction from the customer's mind and leaves behind her a booster for the gas company, is that not worth something? Service of this nature certainly pays a dividend even beyond estimation on a cash basis.

In this article Miss Darling convincingly sets forth the raison d'etre of the Home Service Department. Reading between the lines one may gather that this phase of a gas company's activity can become superfluous only when it is conducted in a half-hearted manner.

Protecting Company Sales

Besides the good will and confidence gained in the home calls of the instructor, the company sales are protected by them. Every gas company knows the type of customer who buys a gas range and then because her neighbor has a different make and she wants to change hers for the same type, claims that the range sold her is unsatisfactory; perhaps she claims that a scratch was on the oven door when it was delivered to her, or still, the oven doesn't bake well.

The Home Instructor calls as soon as possible after the range is installed and by showing the customer that the gas company really is interested in her after the sale is consummated, breaks down any possible thought of dissatisfaction, and often saves the gas company the trouble and expense of changing the appliance to suit the customer's whim. A glance through the files of a Home Service Department would go a long way in convincing the most skeptical, conservative business man that Home Service can rightly claim credit for part of the company's continued success in the face of increasing competition. The following instructor's report shows a definite money saving:

"The customer at this address spoke very broken English, claimed the gas range could not bake her huge loaves of foreign bread; said she would make no more payments; that she was going to have the gas range removed and her coal stove re-installed. Helped her to bake bread, biscuits, cake; left her very much pleased and thoroughly convinced that there was nothing whatever wrong with the gas range. It was merely lack of knowledge of how to cook with gas."

The question is, would a salesman, even the best of salesmen, be able to make the right contact in cases of this nature or be competent to show this woman where she was making a mistake? Work of this sort certainly requires a woman—a woman well-trained in cooking and its problems, as well as in the theory of combustion, heat-control adjustment, fine connection, etc., who has also good, practical everyday experience in the art of homemaking; a woman of tact, pleasing personality and resourcefulness, to cope with the many and varied conditions she must meet. These are a few requirements necessary to be a successful Home Service Instructor.

Furthering Efficient Appliances

While the principal object of a gas company is to sell gas, the merchandisng of gas appliances is a very important side line, for it is through the increase in number and use of the appliances that gas consumption is boosted. Home Service has done much to bring such gas appliances up to a high standard and to encourage a demand for, and increase the use of such appliances. In the past, all types of inefficient appliances were sold by house furnishing stores. It is said that a fuel (gas, for instance) is only as efficient as the appliance through which it is used. Inefficient, wasteful appliances are enemies of the gas company. It is noticeable that in the cities where the gas company boasts of a Home Service Department, many home furnishing and department stores have discontinued gas range departments, thus eliminating many of the cheap ranges that did not have the approval stamp of an efficiency test and which only made dissatisfied gas users, the blame usually being laid to the gas and seldom to the appliance. The gas company has gradually come into its own as the logical center for information on gas and gas appliances. But how can Home Service claim credit for this? What definite proof is there to show that it is in part the work of the Home Service Department that brought about this greater use and demand for high grade appliances?

The following instance alone may well justify that belief. Some time ago, in a four-lesson cooking course given to a group of eighty women, members of a local church, a certain high grade range was used in preparing the recipes given in the class. The Home Service Department, abiding by the rule of selling through satisfactorily cooked products only, make no attempt to otherwise advertise the appliance used. Since this cooking class was given eleven members of this class purchased gas ranges, and in each case they insisted on buying the same type of range used in the classes. No doubt many of the all gas ranges replaced the coal and gas combination or some even straight coal. Knowing this, how can it be said that the results of Home Service cannot be shown in dollars and cents?

Some Conclusive Figures

The following sentences are taken from a letter written by the store manager in the territory in which this cooking course was given: "I know that these sales are the direct result of the friendly spirit that was created at these cooking classes. I was interested in looking over records of gas ranges sold for January, 1926, to find that only 18 per cent of our sales were cabinets, but in January, 1927, the percentage of cabinets had increased to 37 per cent. I believe that this higher standard in quality of our sales is due to the cooperation we have received from the Home Service Department." If the company has wide-awake salesmen in the sections where the cooking classes are held there is no question that they can readily capitalize the opportunities that Home Service has opened up for them, showing a profit both on appliances and increased gas consumption, besides adding to the number of boosters for gas cooking.

Too many gas men believe that the cooking courses given by the Home Service Departments are merely demonstrations of fancy, elaborate dishes and a means of exhibiting the culinary ability of the instructor, whereas, the underlying purpose of every successful Home Service Department must be the great desire to sell the commodity by which the successful results in cooking were obtained. Another cooking course is brought to mind, this course being given to a group of women who did not use gas in their homes. In fact, many admitted a fear of gas. It is hard to believe that this group of women could be interested in attending lectures merely on gas, but is it not reasonable to believe that the information that was subtly given them on gas and its safeness during the courses of the cooking classes was worth dollars and cents to the gas company?

The Paramount Idea

One of the most important goals of Home Service is to increase gas consumption. The cooking courses, especially those given to brides and women in business, seem to result in increased gas consumption, perhaps more so than any of the other cooking courses, the probable reason being the novelty to one who has never cooked before of trying out new recipes and passing along to other members of the family the new ideas learned in the cooking classes.

In the course where diplomas are issued the class members are required to report results on at least two receipes from each lesson. The steady drive by canned food companies must also be counteracted. It must be admitted that canned foods are here to stay. Knowing this, what can the gas company do? The gas company cannot stand back and bow to the inevitable; they must fight—fight with, not against its competitors—canned foods and the can opener. Home Service has recognized this and in many class recipes canned foods are used in some made up dish that requires much longer cooking than the mere heating up of the contents of the can. A letter sent to a branch store manager by the pastor of a church in which a cooking course was given, encourages the thought that this course did more than increase the sales recepits; it also increased the gas consumption.

"Dear Sir:

May I take the privilege of expressing my apprecition for the splendid way in which the cooking class was conducted in my parish house last month and part of this month. The lectures and demonstrations were both interesting and instructive, and your manner of presiding most pleasing and acceptable to all. It may interest you to know that already the ladies are asking if we are to have another cooking school next fall. Several of the women have expressed themselves as having a new incentive to do home cooking as a result of the efforts of the cooking instructor and her assistant. Personally I look upon the cooking school as one of the leading social events of our church year.

Signed:

....., Pastor."

It is interesting to relate that in one church where classes were given the church charged admission and the proceeds were given as part payment on a gas appliance for the church rectory.

Experience With a School

In a school where there was to be a cooking course it was found that there was no suitable gas range for use during demonstrations. A heat-controlled range was installed by the gas company for the demonstrations and at the conclusion of the course the school purchased the range for use in the regular domestic science laboratory. The fact that a very clever salesman had for some time vainly tried to interest the school authorities in buying new equipment prior to these demonstrations is also food for thought for the skeptical. If the young girl in school is taught to cook on the latest type of gas range, certainly that too will not only affect the standard of gas range purchased for the home, but it will also put gas in many homes where heretofore only coal was used.

To repeat, good will and confidence is worth money to any business organization. Home Service gains this friendly feeling, good will and cooperation for the gas company through its many unique services to the customer. Fair play for the customer and from the customer saves money already earned. Home Service, with its minute

reports, gives records which insure fairness. The higher standard of gas appliances means more satisfied gas users and more appliance sales, resulting, of course, in increased gas consumption. Home Service creates this demand for better merchandise through demonstration cooking lessons where the successful results in cooking, when compared with some of the failures in a home where there is inefficient equipment, create a desire for the new appliance. A gas company is in business to sell gas. In the face of the large sale of delicatessen food and canned products, the company cannot hold its own in gas consumption unless some decided move is made to offset the mania for "easy-to-get" meals. Home Service with its cooking classes strives to make cooking a pleasure, "an exciting adventure into the realm of foods." Does not the following report from a cooking class graduate indicate that it has been successful?

Back of the Home Service Department idea is the great ideal of service. Too long has it been whispered, written and broadcast across the land, "our home life has disappeared." Too much repetition soon makes a truth. Why say it? Why for one moment believe it? Our home life has not disappeared. The housewife still finds pleasure in her kitchen, not the kitchen of her grandmother, but a bright sunshiny kitchen with its modern gas appliance, and Home Service is doing much to make the housewife happy and contented there. A healthy, well-fed family makes a happy home. A happy home makes better business conditions and better business conditions make a more prosperous gas company.

Report Sheet

NAME Mrs. Irene White ADDRESS 3910 Ridgewood Ave,

COURSE Bride's Course DATES Feb 6 April 1

	Dishes Tried	Comment
Lesson I Cakes	Lightening Cake Boiled frosting	used the cake with a pineapple cream filling always make the boiled frosting mine. Like it better than the confectioners icing.
Lesson II Fish Dishes	Made everything but the Hollandaise sauce	had this dinner twice for company and was very pleased & the fish luck I had with it.
Lesson III Left Overs	Spanish Potatoes Lamb and rice	Made the potatoes talk with slices a very good way to use up mashed potatoes. Lamb & rice good
Lesson IV Hearty Salads	Carrot salad Macaroni salad	Liked both but the macaroni was the most famed
Lesson V A Pork Luncheon	Lost the recipe receipe. Will am very anxious	sheet with the salmon loaf you send me another as I & make it
Lesson VI Hot Breads	Coffee cake Standard muffin Corn muffin Date muffin	I now have the coffee cake every Saturday night for supper Sunday morning for breakfast. Made the date bread with less sugar as I thought it was too sweet.
Lesson VII Sunday night Friends	Nut bread Cheese date sandwich Vienna Sandwich Hard boiled filling	have made the nut bread six times already. My husband insists on having the sandwiches made with it. Made the sandwich filling for a St Patrick party and gave the recipe to many of my friends.

This sheet is for our records, please bring it with you to the last lesson.

BOSTON CONSOLIDATED GAS COMPANY,
HOME SERVICE DEPARTMENT

FROM ACROSS THE POND

The Luton Gas Company, of Luton, England, has gotten out a calendar, a page of which is reproduced herewith, which serves the dual purpose of keeping one up to date and telling the gas story in a strikingly humorous fashion.

Refrigeration by Gas Winning Public Favor, Sales for Year Indicate

That the use of gas to produce refrigeraton is now far past the experimental stage is evidenced by the brisk sale of gas-fired refrigerators during the past year.

These refrigerators have no moving parts, but depend upon the absorption principle, using gas to generate the necessary heat to start the refrigerating cycle. At the recent convention of the American Gas Association at Chicago, three different refrigerators were displayed, all using different freezing mixtures, of which ammonia is a part. Gas is used to expand the ammonia, which is afterwards cooled by means of water.

The cooling mixture is hermetically sealed within the machine and no replacement is ever necessary. The temperature within the box can be maintained at any desired point from zero up.

One interesting combination shown at the convention consists of a gas stove with a gas-fired refrigerator underneath, the combination being intended primarily for use in kitchenettes of apartment houses.

Capitalizing the Extra Day in February

A window display that proposes the use of the leap year motif

By Ray Martin

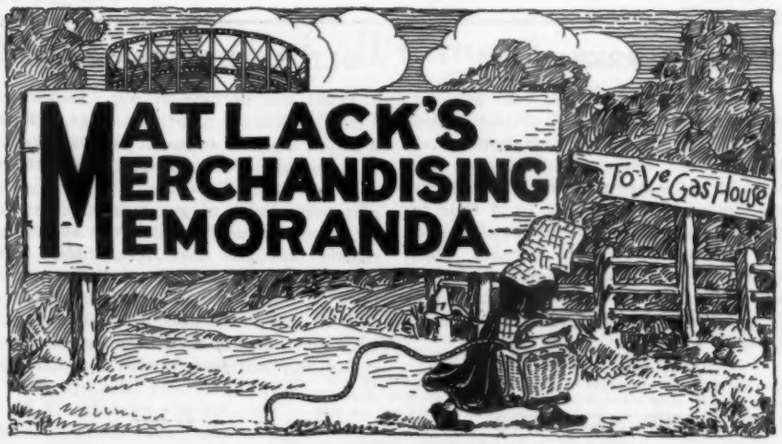
Chairman, Window and Store Display Committee, American Gas Association.

PERHAPS no window display advertisement for use during the month of February could be more timely than one dealing with Leap Year. Also, a gas company's valuation of the added convenience of one extra day's use of an automatic gas water heater is not to be disregarded.

The photograph here reproduced is especially interesting, as it shows that a "human interest" window display can be effective without being elaborate or necessarily expensive. A major portion of the cost of this window display was devoted to the preparation of the original sketch. In this case as in all others, a complete color sketch on a scale of one inch = one foot was prepared, showing the exact measurements of the large display. It was then a comparatively simple matter to produce the display pictured.

It is of particular interest to know that in this window display advertisement the "Leap Year" headline, as well as the calendar page and cartoon figure, are only used as a means to induce the passer-by to stop and look. After such attention has been aroused, we endeavor to drive home the most important part of the display—namely, "Your Gas Company will gladly advise the proper type for your home."

In window display advertising we must anticipate public reactions.



DIRECT FROM BURMA

One of our fitters who has just returned from a Chef's tour to Burma has presented us with a print, from a scrub oak block, which we have decided must be an artist's drawing of an ancient sperm oil percolator. We are told the original urn or percolator is a work of art, color harmony, symmetry of design and utility, all having balance. Be that as it may, the point is, What could a gas man do with it? That's what we asked and, by George! here's a suggestion we received from a toaster expert: "You know," he said, "with all this cry for new ideas in appliance design, why would it not be a happy thought to use some such design as that for water heaters?" We were too full to answer, but we have suggested a name for such a heater, if anyone decides to apply art to water heaters; here it is—take it!

BETTER RETAILING

"Better Retailing," by National Cash Register Company, is crammed full of good ideas for the gas man. An agent friend of ours presented us with a copy the other day and we have placed it along side of a few other books that we pick up when we get fed-up on "Foolish Fiction," "Hashed-Over Humor," and the radio runs bedtime stories, market reports, melody and jazz in the altogether.

SPEAKING OF COLOR

Speaking of color—why, brother, it's a craze that has captured the country. Special writers in newspapers and magazines are spreading Tangerine, Canary Yallar, High Brown and Pea Green on everything in sight. Color may beautify and color may—Oh, boy, do you see what I see?—and the gas man who does not get on the painted wagon may as well make up his mind that some dealer will. So why not study the new offerings and color? The Terre Haute (Ind.) Tribune, under the heading "Color Captures the Kitchen," says:

"In a brilliant shower of color, the rainbow drops into the kitchen. The blue kitchen or the yellow kitchen, the same as the blue chamber and the gold drawing room, is the latest idea of beautification of the home to capture fancy and good taste in the home of culture and refinement. It already has a vogue with the woman who is seeking better things for her household and it is spreading fast.

"In other words, the interior decorator has finally found his way into the kitchen. Like the prince in the fairy tale, he has called on Cinderella and what's more—proposes to put her in a setting artistically on a par with the rest of the home, making it a room of appeal through the use of a prevailing color or a planned scheme of harmonious tints and shades.

"A real feature of the villas and mansions of the ultra-rich, but enhancement that a home of modest income may as easily have as not, the color kitchen has captured both the imagination and common sense of people who realize that beauty and charm have their values just as much as practical workaday usefulness.

"The kitchen of harmonized color is exactly what the words picture. One prevailing color extends entirely throughout the room, or tints and shades of a primary color are synchronized in peaceful association. Every article in the kitchen is in tune from the standpoint of color. The walls and the floor, the draperies, if there are any at the windows, the woodwork, are all akin to the same ruling color. The tables and chairs, the kitchen cabinet and even the clock on the wall conform to the color scheme. Kitchen utensils, the enamelware and all kitchen equipment are in step with the commanding hue.

"If it is a blue kitchen, the enamelware is blue. If it is yellow, it is yellow, and so on throughout the citadel of cookery.

"The ambition for a kitchen of complete color-harmony at the outset bumped up against an article—the most important equipment in the kitchen, and the most prominent—the gas range. One manufacturer, however, quick to sense dereliction on the part of gas ranges, it is reported, has rushed aid to the situation. Roper Ranges, familiar to all housewives, have appeared in colors which coincide with the popular fancy and the practical demands of color furnishing. Color ranges add a pleasing and a new note to what has not been an especially vivid item of household equipment. The new ranges are porcelain enameled in Poudre Blue, Imperial Red, Jade Green and Canary Yellow. Each color strikes the eye very effectively. The legs, and practically all the prominent portions of the stove are in color. Certain other portions are enameled in soft gray which blends with the prevailing color, giving an impression of completeness of one color, without the monotony an all-over color treatment is likely to create. The color range is a fitting and necessary culmination of complete kitchen harmony.

"Decorating kitchens in an agreement of tones and tints has already made noteworthy headway with women of culture and refinement. Architects and builders are incorporating it in their program of design and construction. Sponsors of attractive homes are demanding it.

"It is doubtful if anything as simple and at the same time as striking, has entered the home in a long time.

"Department stores and furnishing establishments of a number of metropolitan cities have already exhibited model kitchens in harmonized color. The response to the idea has been one of the most pronounced business reactions of the year. Wherever these kitchens have been displayed they have attracted crowds, and the effectiveness of them is manifest in the expressions of inter-

est and approval from those who have viewed them.

"There is no reason why the kitchen should not have a charm of its own. As a matter of fact, if a kitchen is attractive it is mighty hard these days to keep company out of it, especially when the gathering is informal."

Editor's Note: Several manufacturers are offering colored ranges and water heaters; turn to our advertising sections for full details.

CO-OPERATION

One way to get co-operation is *to co-operate;* get behind the Blue Star movement, even if you do feel that "dealers are going to profit by it and exploit a lot of appliances you would not handle, and get away with it, because of the Blue Star." This would be a doleful place if we all were of the same opinion and, too, gas ranges would be prohibitive in price, for there would be but one manufacturer and maybe he'd insist on selling his own stuff.

FREE TRIAL

The Laclede Gas Light Company, St. Louis, has Free Trial sales of appliances, but they confine the Free Trials to home owners—there's an idea that may be helpful to some gas men whose experience with Free Trials has "not been so good."

BE PREPARED

March is at hand, and that gas man who has not planned to get into action with a water heater drive should mark his calendar today. Folks never miss the old hot water until the furnace fires are drawn—and that is a good time for the gas man to do a little drawing—pull the old coil out of the furnace; allow your customer from two and one-half to five dollars for it on the purchase price of a self-action water heater.

KITCHEN AIDS

KITCHEN AIDS are sales aids, and we suspect them of being per meter sales aids as well. Anyhow, small related appliances are coming into their own. Gas companies all over the map

He Figured It out for Himself — and Went to Sleep
BY GEORGE I'VE GOT TO GET SOME BUSINESS THIS YEAR. HOW "MY GOING TO DO IT?
NOW LETSSEE. THERE'S 10% REPLACEMENTS OF RANGES THAT'S 62% OF METERS BUT — LETSSEE
HOW WAS IT THAT FELLOW SOLD 02% OF HIS CUSTOMERS SELF ACTION GAS WATER HEATERS — BUT
OUR TOWN'S DIFFERENT — YOU CAN'T DO THAT AND —
HOW I WONDER HOW THAT BIRD BUILT THAT QUOTA — NOW LETSEE — THERE'S
NO USEIN MY KIDDIN' MYSELF WITH THAT STUFF I'VE GOT TO DO A BIT
OF THINKING — THIS IS PRESIDENTIAL YEAR AND — AND — OF COURSE OH! HERE IT IS I'LL JUST CUT
PRICES AND GIVE ONE OF THOSE LITTLE "COOPS" WITH EACH RANGE! That's an Idea!

OLD SATURATION POINT

What has become of old "Saturation Point"? We do not think there is such a point, and the outlook for 1928 seems to indicate that another theoretical member is to be shot. Old 10% Replacement Sales of gas ranges seems to be doomed, and it's all come about by reason that gas men have studied the merchandising methods of their neighbors. Color in ranges and water heaters as we view it is only a forerunner of what is to come, in gas appliance merchandising and merchandise.

THE SOLUTION

The Consolidated Gas Company, New York, is after old man smoke and soot, and, as the advertisement reproduced here will indicate, have attacked the problem in a logical manner: "Since these remarks were made, your gas company has taken the practical step of putting into effect lower rates for house heating, large volume water heating and industrial purposes"— As a midlander we know what it is to be a human soot-consumer and as a gas man we realize that the only solution to the smoke problem is to make it possible for more and more people to use gas for house heating and water heating, through the employment of a new type rate. So long as homes use solid fuels for house heating and water heating there is no solution to the smoke problem.

$10.00

For Your Old Water Heater

PERHAPS you want the convenience of constant hot water but do not want to discard your present water heater as a total loss.

To make it easier for you to have constant hot water in your home we are offering an allowance of $10 for the water heater you are now using (furnace coil, coal or gas water heater) to be applied on the purchase of any of our self-action storage gas water heaters. This offer also is good under the deferred payment plan of 10 payments with gas bill.

A self-action water heater will provide a plentiful supply of hot water, ready c c always, at the turn of a faucet. Sizes and prices to suit every need. Come in or phone and our representative will call.

Thirty Days FREE TRIAL for Home Owners

The LACLEDE Gas Light Co.

OLIVE at ELEVENTH — All Phones, Cllmnl 2600

are now displaying and selling small appliances, and giving them as "come-ons" to the customers who purchase new ranges.

APPROACH

APPROACH is a much used word in connection with sales. What are your store or floor sales people being taught regarding the matter of approaching customers who enter the door? Many sales are lost for the simple reason that sales people become timid after having "lookers" say: "No, I was just looking around." Their looking around indicates interest, so why—instead of saying, "Oh, all right," and walking away—are they not instructed to lead the customer over to the laundry dryer, the tangerine range or the breakfast set you are giving with thermostatically controlled ranges—the looker may see something he wants, needs and loosen up—who knows?

You can do it *better* with Gas ...*the Smokeless Fuel*

SPEAKING on the subject of smoke prevention at the Hotel Astor several months ago, Geo. B. Cortelyou, president of the Consolidated Gas Company of New York, said:

"One of the greatest undertakings the gas industry has before it is the tuberculosing in of that day—then smoke, with its attendant evils of dirt and disease, shall be as unnecessary and as little tolerated as the open sewerage systems of earlier days.

"Residents of our Greater City years ago refused to compromise with darkness and drudgery, and we still refuse to compromise with smoke and dirt which pollute the very air we breathe and deface the buildings and properties which we erect and own."

Since these remarks were made, your Gas Company has taken the practical step of putting into effect lower rates for house heating, large volume water heating and for industrial purposes. ..As the services of Gas Fuel are extended, we hope and believe that our Greater City will be restored, year by year, to its rightful heritage of health and sunshine.

CONSOLIDATED GAS COMPANY
of New York

1823 — MORE THAN 100 YEARS OF UNINTERRUPTED PUBLIC SERVICE — 1928

stet . . (of all things) . . by w. h. Emm

THE gas man who works, plans and interviews architects, building operators and owners of apartment buildings, fine residential properties, institutions—both public and otherwise—and finally, after a hard fight, equips such buildings with gas should not be satisfied until the gas industry knows his story and the populace of his city has been duly and properly informed. "Publicity," you say; well, you need it, and when you get right down to brass tacks, unless you are an exception, you want it. It is paid publicity and at the same time it is news; it is good advertising for you and the city in which you operate. It is an indication that you are alive, that yours is a progressive company and community. By all means, when you make a noteworthy installation tell your local newspaper about it and use the fact as a base upon which to build some newspaper and direct advertising. Have some photographs made of the buildings and the installations. Make it a point to have photographic records of every job of this kind that you do and use these photographs both to sell your customers and for newspaper and other advertising from time to time.

THE LACLEDE GAS LIGHT COMPANY
LACLEDE GAS BUILDING
OLIVE AT ELEVENTH
ST. LOUIS

Dear Fellow Employe:

We are sending you a little booklet, "The Sign of The Modern Home" to help keep you up-to-date on the latest effort (The Blue Star Plan) of the gas industry to popularize ample gas service facilities and quality appliances as an essential unit of every modern home.

The cleanest, most reliable and efficient source of heat for all household purposes is Gas - the ideal domestic fuel. Yet the provisions made for gas service in the average house are practically always inadequate.

Recent invention and scientific developments in the manufacture of appliances for the utilization of gas in the service of the home have made gas just as up-to-date as radio in the many new services which it performs in the household today. Gas is now the most modern agent for cooking and refrigerating food, disposing of household waste, providing hot water for household cleanliness and for personal toilet, insuring comfortable temperature at all seasons of the year, and permitting clothes to be washed, dried, and ironed in the home under conditions of known cleanliness. These services make gas the world's greatest caterer to the fundamental needs of the home.

More than one-half of the homes of the nation are now able to enjoy the comforts and conveniences of gas service for one or more purposes. Many use it only for cooking; some for cooking and water heating, and others for more extensive purposes. But only a few homes are equipped to permit the utilization of gas for all of the things it can do best.

The Blue Star Plan is a co-operative sales program to popularize adequate piping and venting and a more complete installation of quality gas appliances as an essential unit of every modern home. It aims to accomplish this locally in the minds, not only of the public, but also of the architects and builders, plumbers and dealers and every trade factor associated with local gas service.

Keep this little booklet handy and familiarize yourself with its contents. It will help to keep you on the alert for prospects for gas appliance installations that can be made productive of bonus revenue for you. Learn what "The Blue Star Plan" is so that you will be able to explain it to our customers who may ask you about it.

Very truly yours,

THE LACLEDE GAS LIGHT COMPANY.

Manager Commercial Department.

"With colored and kindred merchandising to inveigle the modernistic customer, is there any reason for clashing prices and piling up premiums to sell a gas range or water heater?" asks an Eastern gas man, who then answers his own question as follows: "It seems to me that too many gas men are following the lead of electrical merchandisers or are permitting themselves to be led by men who are electrical merchandisers." To the fraternity at large we, like the Black Crow, must ask: "Well, what's the reason for that?"

There is a midland gas man who is putting the Blue Star Plan over in a way that is worth knowing about. He is starting his educational work from the right end—here's the way he goes about it. He sends each of the employees of the company the following letter with a copy of "The Sign of the Modern Home" booklet issued by the American Gas Association.

We hope he also persuaded some of the higher-ups to read this letter and booklet as well.

February is the month to build up the load per meter by staging a waffle iron sale. Sell them at cost and give them as premiums with other appliances; print your offer on your gas bill; advertise it in your newspapers and stage a window and store demonstration inviting folks to try "Crisp brown waffles made with the economical, trouble-free gas waffle iron on their gas range; furnish tested waffle recipes and new ways to serve them."

In the spring a general overhauling occurs in almost every home and it is at that season that the home manager is most receptive to new ideas that will make her home a more efficient institution; she will listen to anyone who may bring her a story about new home labor-saving appliances. Gas man, here is your opportunity. Why not put a little special effort on the home laundry this Spring?

About a year ago we made some suggestions along this line and listed a number of appliances that are needed in this department of the home and which fit in with the idea, "building up merchandise and gas sales per meter." If you do not recall the items we suggested, here they are: 1—gas heated washer, 2—laundry dryer, 3—gas iron or ironer, 4—self-action gas water heater and, 5—a laundry stove. In cities having five thousand meters or more it is our opinion that a special man on these items supported by advertising would pay his way and be the means of increasing sales on other appliances. Those companies who have made a good job of selling the appliances named have displayed them in their stores and windows and have used both newspaper and direct advertising to help the salesmen.

From time to time we have said: "Tell 'em with Headlines," write your advertising story around a snappy, timely headline, surmounting an up-to-date illustration. It is not at all necessary to advertise gas ranges with "boiler plate" (electros furnished FREE). Women with whom we have talked say they read ads that are newsy and carry reasons why, and that they are attracted to such advertisements whose heads run along some such lines as the following: "If Bridge Interferes with Biscuits—Get a Gasco Oven-regulated Range and Go on with the Game," or this one used by the Public Service Company of New Jersey: "See the Range that Cooks without a Cook."

The window display that is in tune with the times—modern or modernistic—will go over with a single appliance displayed—try it—don't be afraid of going over the natives' heads. Most of the big ideas of Broadway are born in the brains of smalltowners—but it takes Broadway to take on the new.

DETERMINING THE FUTURE OF THE WHOLESALE USE OF GAS

By ELMER B. DUNKAK,

Public Service Electric and Gas Co.

WHILE preparing this paper I was cognizant of that truism which says, "The world is blessed most by men who do things and not by those who merely talk about them." This notwithstanding, I have chosen a title that may seem, at first thought, to be both visionary and vague. The word "future" in itself tends to suggest this.

Legerdemain and the psychic are so often associated with this state that the mere mentioning of it suggests dealing with something at once intangible and uncertain.

Insofar as an industry, or, better, a branch of an industry's future, is concerned, this need not be the case.

If Ben Franklin was right in saying that "today is yesterday's pupil," then tomorrow is but the crystallization of today's thoughts—thoughts and actions. An industry's growth and prosperity may depend on many major phases, but each of these is subject to analysis, and to a greater or lesser extent, control. It is this analysis and control that determines the future.

Scope of Paper

The scope of this paper includes but two divisions of a gas company's activities; that is, industrial gas and house heating. These uses, while grouped under a general heading as wholesale applications have, from a sales aspect, very little in common. In brief, one is sold in competition with other fuels on the basis of factory economics. The other is sold, again in competition with other fuels, on the basis of comfort and convenience. In either case gas is in a highly competitive field, but the sales methods must be totally different. For this reason the paper is divided into two parts, the first of which, dealing with Industrial Gas, now follows:

Much has been said and much has been written about the great changes in production methods in American industry. Scarcity of skilled labor, higher quality standards, and increased competition have all played their part in bringing about the demand for automatic heating equipment.

Furnace and equipment engineers, working in conjunction with progressive plant managers, have revolutionized the utilization of fuels and the handling of hot work.

This great progress has not been confined to any one fuel; on the contrary, all fuels—solid, liquid, gaseous and electric—have benefited in varying proportions. As a result of these changes—which by the way are still going on at an ever increasing rate—gas finds itself in a more competitive field than ever before.

Not Indispensable

Aside from its use for a few relatively minor operations, city gas is not indispensable to industry. It is possible to produce work of equally high quality with other forms of fuel, although in many instances considerable change in method of application must be made to obtain this result. Many of the supposedly exclusive advantages of gas can no longer be considered exclusive. For example, the automatic control of temperatures—a factor of major importance in many heating operations—was an exclusive advantage of gas when in 1908 the American Gas Furnace Company's control was placed on the market. Electric heat at that time was only a laboratory toy, and the automatic control of oil was unknown. Today the temperatures of electric, gas and oil furnaces are all being controlled, and in many cases this control is being obtained by instruments of the same general design. In short, improvements in fuel application have made almost every heating operation a prospect for oil, gas and electric heating specialists and not for any one fuel alone.

Status of Industrial Gas

Up to the present time, regardless of the optimistic propaganda which we have heard at conventions and read in trade papers, city gas, if the situation in New Jersey can be taken as indicative, has not as yet assumed a major place as an industrial fuel. To date the industrial market of the Public Service Electric and Gas Company is approximately 3.35 per cent sold.

This figure of 3.35 per cent should not be construed as a criticism of those who make the obtaining and holding of industrial load their work, but rather to show the tremendous size of the fuel market and the vast amount of effort that will be necessary to make an impression on it.

If the gas company is genuinely striving for the industrial load it should cease unorganized and unconcerted efforts and concentrate on such business that is or can be made obtainable. The first step in this direction is the market survey. To my mind, no single influence has greater effect on the future of the industrial load.

The market survey which we recently completed consisted of first gathering operating data at all plants in our territory that used fuel, other than gas, for process heating. This data consisted of, in general, the fuel used, the amount and its cost and the operations for which it is used. The individual operations were further scrutinized as to production, labor costs, percentage of rejects and equipment maintenance. The completed data sheets were next analyzed as to total operating costs and a comparison made with the best existing practice using gas as fuel. In this manner an estimate of both gas consumption and rate at which the consumption would be obtained was made for every plant in the territory. On the completion of the survey the total potential for the territory was determined and classified as to both magnitude and rate.

Effect of Market Analysis

A market analysis, such as this, should have an effect on every future activity of the industrial department. For example, in making of rates, where can a true picture of existing competitive condition be found excepting in a market analysis. The distribution of man power should largely depend on the existing potential load in a given territory. The market analysis shows this. When advertising is planned the classified list of the survey clearly shows who should receive it. If it is proposed that some special research be made to obtain a particular class of business, the potential in this field is immediately available. In fact, this survey is the basis for all planning, and the sooner it is made the sooner will the future for industrial gas be clearly outlined. For, given this information on

---

Presented at annual midyear meeting, New Jersey Gas Association, January 25, 1928, Trenton, N. J.

potential business, the gas company in reality makes its own future.

Before leaving the subject of industrial gas, I would like to touch on two other factors that are also largely influencing the future. The first of these deals with the present practice of furnace designers to stress automatic heating and handling methods rather than a specific fuel. Many of the large installations now being made are influenced more by the production layout that accompanies the quotation than by the operating costs of the equipment. In the future, if we expect our fuel to be considered, we must see that our layout is complete and correct in all production details as well as in gas utilization.

Research Must Be Continued

The second factor deals with the need for continued research. It is only by this means that heating problems in the various industries can be solved, not only from the standpoint of furnace design, but from the more important angle of the effect of various methods of heating on the product itself.

In the second part of this paper I have tried to outline the present status of house heating and the effect of sales methods on its future growth.

Automatic heating in the home has come about with a rush in the past few years. The desire to make the home a more livable place—a thought which receives considerable attention from the average citizen—has shown the necessity of improving heating methods.

The labor, dirt and uncertainty of supply and operation which is attendant to the burning of coal has convinced the majority of householders that a change to another fuel would be highly desirable.

Gas and oil are the two fuels he will consider. Both of these will eliminate labor and dirt. Both will keep his home at a uniform temperature. But here the equality ceases. Only gas will give silent, continuous operation and eliminate worries over continuity of supply. Offsetting this, operating costs using oil are considerably below that of using gas.

It is, then, fair to say that if the home owner wishes the best he should choose gas. It is our problem to show him that the additional operating expense is justified.

Defeating Our Purpose

Now if we attempt to prove this by computing depreciation charges and similar things, we will defeat our purpose. The advantages of gas heating lie mainly in comfort and convenience. It is folly to attempt the placing of a monetary value on this.

In formulating a sales policy for house heating care must be taken that the several phases of this activity be considered.

A standard method for the surveying of homes and estimating of bills must be adopted.

Provision for servicing of boilers sold by the gas company must be made. This service work is of utmost importance because it insures the comfort and convenience which the customer expects.

A definite stand should be taken on approved boilers installed in the approved manner, but not sold by the gas company. The dealers for these boilers should be told that the gas company representatives are ready to co-operate, not only in estimating boiler sizes and gas consumption, but in actual sales work as well. The same free service that is given gas company boilers should be given to these boilers.

Of great importance in the sales policy is the provision that is made for heating trade good will. If real progress is expected from house heating, the active co-operation of the heating trade must be secured. This can only be obtained by turning over all sales to the trade and permitting them alone to make installations. Once our relations are firmly established, we will have a small army co-operating with us, the value of which will be almost too huge to measure.

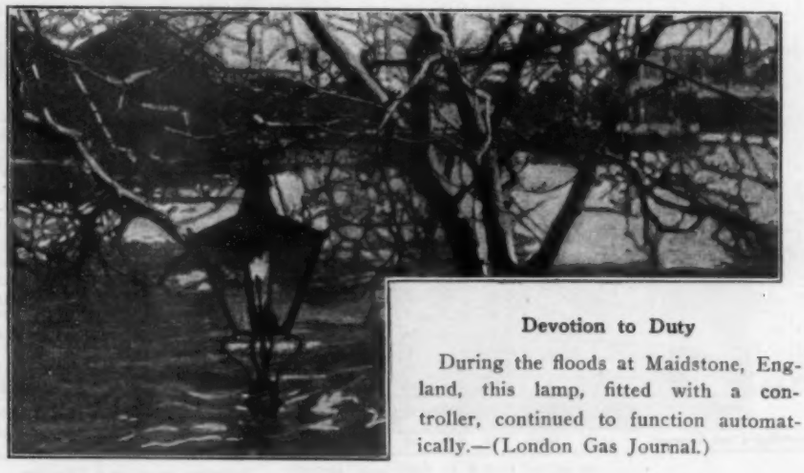
Rousseau said that "Nations and men can only be reformed in their youth; they become incorrigible as they grow old." The gas industry is old as industries go. Let us hope it is not incorrigible and that relations of mutual benefit with the plumbing trades can be for once definitely established. Nothing else will have as great an effect on house heating sales.

The methods we use and efforts we make today are the factors which shape the future. The burden is directly on us.

GAS AIDS IN MAKING RECORD-SIZE TELESCOPE DISC

A large pot furnace fired with city gas was used for melting the batch from which the Bureau of Standards made an optical-glass disc of record dimensions. On January 20 this disc, which had been cooling and annealing under carefully controlled conditions for more than eight months, was uncovered. A magnificent optical-glass disc, 70 inches in diameter, 11 inches thick and weighing about 3,500 pounds, was revealed.

The furnace in which the melt for this glass disc was made is one built by the Bureau in its ceramic laboratories. The batch consisted of 100 pounds of broken glass, of the same composition as the disc to be made, and 4,600 pounds of chemicals and sand. This material was melted with hand stirring during a six-hour period on May 7, 1927, and the glass was poured from the furnace at a temperature of 2400 degrees F.



Devotion to Duty

During the floods at Maidstone, England, this lamp, fitted with a controller, continued to function automatically.—(London Gas Journal.)

Equipment News

The "Baby Digger"

During the past few years the use of machines for digging trenches for the laying of gas mains has greatly increased. Formerly the only available trenching machines were of a type very large and cumbersome. Now a lighter and more compact construction has made them of particular service to gas companies.

A concern that has given much attention to this matter is the Cleveland Trencher Company, Cleveland, Ohio, "pioneers of the small trencher," who manufacture the "Baby Digger." This machine weighs but four tons and has an overall width of only 58 inches. Machines of this type are now being used in our large centers of population with excellent results.

The following table shows what one gas company has been doing in the way of trench digging, and the cost per foot, which in most cases is less than one-third the cost of trenching by hand.

An illustration of the "Baby Digger" is shown. It has the wheel type digging mechanism and is mounted on full crawler tracks, and has three bucket line speeds controlled through a transmission, six digging speeds, a quick-shifting conveyor and a safety clutch which protects both the machine and underground pipes which may be encountered in digging, are several of its features. All levers are conveniently located and the operator has a clear view of the digging action

Moving this machine to different locations is quite simple; for its light weight and compact construction permit quick transportation either on truck or trailer. This company, in fact, supplies a trailer on which the machine can be loaded or unloaded in five minutes, and moved on to the next job.

New Small Size Atmospheric Recording Thermometer, Using Four-Inch Charts

Of unusual interest to users of recording thermometers will be the latest addition to the "Bristol's" line; a miniature size instrument using a chart but four inches in diameter, developed by the Bristol Company, Waterbury, Conn. Charts used are designed with particular attention to the type of service required, and offer very clear readings over appropriate ranges.

The new model is entirely self-contained. When installing it is simply necessary to place wherever temperature readings are desired—no leads or other form of connections are needed. Light in weight; equipped with convenient handle and leg rests; thus easily portable. The case is also designed to permit of mounting on wall, post or other support if desired.

Every care has been taken to insure accurate, dependable readings and trouble-free operation. The measuring element consists of a bi-metallic helix which is positive in operation and extremely sensitive to temperature changes. The penarm is attached to the measuring element and records directly on the chart without the aid of any intervening or complicated multiplying devices. A special frictionless form of inverted penarm with fountain pen is standard equipment, assuring a sufficient supply of ink, and a uniform record line over the complete chart revolution of 72 hours. The clock used to revolve the chart is specially made for the purpose, having all parts plated

	Month	Year	BABY DIGGER	Interest Taxes Administration	Depreciation	Mtce. Repairs & New Parts	Cost of Gasoline	Cost of Oil & Grease	Operators Hours	Operators Wages	Laborers Hours	Laborers Wages	Total Expense	Total Trench Feet Excavated	Aver. Depth of Trench	Aver. Width of Trench	Cost per Trench Ft. By Machine	Estimated Cost Per Trench Ft. by Hand Labor	Savings Per Trench Foot By Machine	Estimated Total Cost Hand Excavation	Total Saved by Machine	% Saved	Hours Used	Cost Per Hour Used	Hours Per Day Used	
1	MAY	1924	NO 1	$ 43.19	$ 122.72	$ .00	$ 9.38	$ .72	91½	$ 65.88	40	$ 24.00	$ 265.89	4170	3½'	20"	$ .0638	$ .48	$ .4162	$ 2001.60	$ 1735.71	86	91½	$ 2.90	5.32	1
2	JUNE	"	"	"	"	24.34	6.86	.39	58	41.76	85	49.80	283.06	2457	3½	"	.1152	.45	.3148	1056.51	767.45	72	58	4.98	6.44	2
3	JULY	"	"	"	"	.00	25.34	1.58	175	126.00	266	159.60	478.35	8343	4'	"	.0535	.47	.4165	4283.21	3724.86	88	175	2.73	7.29	3
4	AUG.	"	"	"	"	8.75	13.72	.98	111	79.92	25	15.00	284.28	4802	3'	"	.0592	.42	.3608	2016.84	1732.56	85	111	2.56	5.94	4
5	SEPT.	"	"	"	"	33.40	14.00	1.17	95	68.40	195	117.00	398.88	4910	4½'	"	.0812	.53	.4488	2602.30	2203.42	84	95	4.20	5.94	5
6	OCT.	"	"	"	"	18.20	20.44	1.17	143½	103.32	288	172.80	481.84	9388	4'	"	.0574	.53	.4726	4445.64	3963.80	89	143½	3.35	6.93	6
7	NOV.	"	"	"	"	18.85	23.10	1.69	150	108.00	362	181.20	490.75	7011	4'	"	.0700	.48	.4100	3365.28	2874.53	86	150	3.27	6.32	7
8	DEC.	"	"	"	"	3.60	5.60	.78	37	26.64	66	33.60	242.13	1907	4½'	"	.1270	.35	.2230	667.45	425.32	63	37	6.54	3.70	8
9	APR.	1925	"	"	"	43.75	11.06	1.34	83	59.76	199	95.40	377.12	6320	3½	"	.0600	.32	.2600	2022.40	1645.28	81	83	4.54	4.88	9
10	MAY	"	"	"	"	.00	15.82	1.09	85	61.20	122	73.20	318.02	5748	4'	"	.0553	.43	.3637	2471.64	2153.62	87	85	3.74	4.47	10
11	JUNE	"	"	"	"	.00	22.32	2.21	139	100.08	327	196.20	486.72	6381	4½'	"	.0763	.36	.2837	2297.16	1810.44	79	139	3.52	6.00	11
12	JULY	"	"	"	"	.00	14.55	1.50	85	59.76	86	50.40	292.12	5376	4'	"	.0543	.28	.2257	1505.28	1213.16	80	85	3.47	4.20	12
13	AUG.	"	"	"	"	.00	19.65	1.69	124	89.28	127	76.20	352.73	6515	4'	"	.0541	.28	.2259	1825.32	1472.59	80	124	2.84	5.16	13
14	SEPT.	"	"	"	"	34.05	15.90	1.50	101	72.72	92	55.20	345.28	5731	3½	"	.0665	.28	.2157	1604.68	1259.40	78	101	3.41	5.05	14
15	OCT.	"	"	"	"	25.00	12.00	1.30	83	59.76	91	54.60	318.57	4282	4'	"	.0744	.34	.2656	1455.88	1137.31	78	83	3.83	4.88	15
16	NOV.	"	"	"	"	12.35	9.00	1.04	53	38.16	57	34.20	260.66	3195	4'	"	.0816	.34	.2584	1086.30	825.64	76	53	4.91	3.12	16
17	DEC.	"	"	"	"	32.25	24.80	1.82	116	83.52	128	76.80	584.30	6931	4½'	"	.0554	.45	.3946	3118.95	2734.65	87	116	3.31	6.12	17
18	APR.	1926	"	"	"	9.05	18.45	2.60	124	89.28	199	119.40	404.69	4283	4'	"	.0945	.45	.3555	1927.38	1522.66	79	124	3.26	7.30	18
19	APR.	"	No. 1	"	"	9.14	20.25	1.95	129	92.88	242	145.20	435.59	6641	4'	"	.0655	.34	.2745	2257.94	1822.61	81	129	3.37	7.16	19
20	MAY	"	No. 2	"	"	13.70	19.20	1.82	150	108.00	189	113.40	422.03	4988	4½'	"	.0846	.45	.3654	2244.60	1822.57	81	150	2.81	8.33	20
21	MAY	"	No. 1	"	"	13.70	22.72	3.77	196	141.12	382	229.20	576.42	11679	4'	"	.0493	.34	.2907	3970.36	3394.44	85	196	2.94	8.52	21
22	JUNE	"	No. 2	"	"	15.36	24.59	4.62	235	169.20	235	141.00	521.08	9570	3½	"	.0544	.45	.3956	4306.50	3785.42	88	235	2.21	6.70	22
23	JUNE	"	No 1	"	"	183.80	38.25	3.62	176	126.72	352	211.20	726.90	10732	4½	"	.0677	.28	.2123	3004.96	2278.06	75	176	4.13	6.77	23
24	JULY	"	No. 2	"	"	10.00	11.22	.46	48	34.56	91	54.60	276.75	1706	4'	"	.1622	.34	.1778	580.04	303.29	52	48	6.15	6.43	24
25	JULY	"	No. 1	"	"	23.10	4.25	1.30	45	32.40	45	27.00	252.96	2079	4½	"	.1217	.34	.2183	706.96	453.90	64	45	3.36	3.45	25
26	AUG.	"	No 2	"	"	11.80	9.78	1.30	79	56.88	79	47.40	293.07	4112	4'	"	.0713	.28	.2087	1151.36	858.29	75	79	3.71	6.07	26
27	AUG.	"	No 1	"	"	12.69	23.50	3.30	70	50.75	70	42.00	298.75	3665	4½	"	.0815	.28	.1985	1026.20	727.45	70	70	4.27	4.12	27
TOTAL				$ 168.13	$ 313.44	$ 543.58	$ 455.35	$ 46.33	2980	$ 2145.95	4336	$ 2601.60	$ 10376.68	152528 ft. 28.88 Mi.	4'	20"	$ .0673	$ .39	$ .3190	$ 58923.11	$ 48648.43	83	2980	$ 3.45	6.03	
Percentage of Total Expense				11.35	3.24	5.30	4.43	.45		20.88		25.32	100.00													

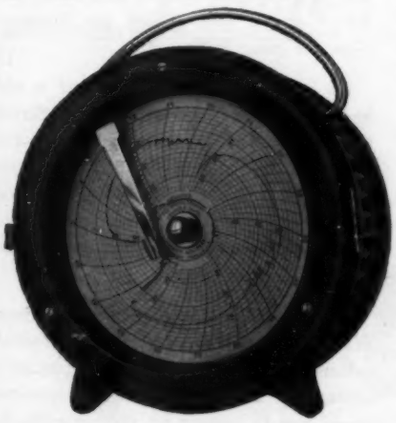
Machines Cost $4850.00 Plus $38.00 Freight = $4908.00. Interest, Taxes & Administration = 9/200 of 1% per Month. Depreciation = 2½% per Month.

Gasoline from Company tank at 15¢ per Gallon. Oil from Company Garage 50¢ per Pint

Operators Figured at 72¢ per Hour. Laborers " " 60¢ " "

with a rust-proof preparation to safeguard against any possible action of moisture.

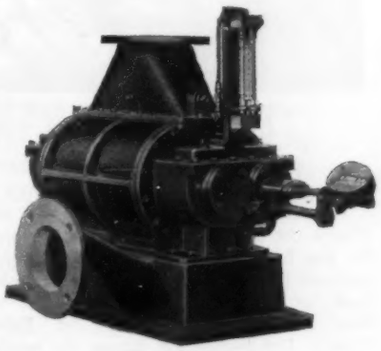
The low cost of this new model permits the use of a reliable recording thermometer for important applications otherwise prohibitive because of price.



New Connersville Meters of Smaller Capacities

In order to offer a more complete line of metering equipment, especially covering the lower volumes of gas, there has been added to the various sizes of Connersville Meters which have previously been listed and built, two new sizes which are described in the supplementary sheet to Bulletin 4C. These smaller meters, having normal ratings of 8,000 and 10,000 cu. ft. of gas per hour with each covering a very wide range, are claimed to offer for very large industrial consumer installations or for departmental control of gas consumption in steel mills, food product plants, etc., as well as in the smaller gas plants, the same dependable accuracy of measurement that is being obtained from the larger Connersville meters which are already in service.

In addition to accuracy, some of the features stated to obtain with these meters are low differential, accuracy over a wide range, bearings outside the zone of gas flow, small space required for installation, and ease of installing.



A New Service Pump

The American Steam Pump Co., Battle Creek, Mich., have issued a pamphlet describing the Barton Portable Pump. The illustration shows how the pump is attached to the motor crankshaft of an automobile. It is light weight, is entirely supported by the car frame, and has a road clearance greater than the front axle. The pump is started and stopped by a simple hand clutch. It will lift water 20 feet by suction at comparatively low motor speed.

Barton Pumps are made in five sizes with capacities to 900 gallons of water per minute, without overloading engine. Descriptive matter will be sent on request to the manufacturers.

Above—Barton pump in use for collecting drip from gas mains.

To right—Pumping water from trench.

Taken from Previous Issues of the American Gas Journal

10 YEARS AGO

The North Shore Gas Company of Illinois not only filled the unusual demand for gas for lighting, cooking and heating purposes made on it during the recent cold spell, but even loaned 3,000 tons of coal to Fuel Administrator Erskine, of Lake County, for distribution among the needy families of Waukegan, North Chicago, Lake Bluff and Highland Park.

Frank Carder has been appointed manager of the Oklahoma Gas and Electric Company, Norman, Okla., division, succeeding W. P. Jones, who resigned.

George Steinwedell, advertising and commercial manager of the St. Paul (Minn.) Gas Light Company for the last twelve years, has been appointed general manager of the Birmingham (N. Y.) Gas Company. Mr. Steinwedell assumed his new duties February 15.

The Baltimore (Md.) Gas Appliance and Manufacturing Company held its annual meeting recently at which a 3½ per cent dividend was declared on the preferred stock and a 1½ per cent dividend on the common to stockholders of record on February 23. The dividends are payable March 1. All officers and directors of the organization were reelected.

20 YEARS AGO

The first real glad tidings of Leap Year, as far as the gas business is concerned, go to you from Milwaukee, Wis., where "Saturday fortnight," twenty-two young women in the employment of the Milwaukee Company charmingly chaperoned an equal number of young men who figure on its payrolls. The events were a sleigh ride and a supper. The air was glace and the snow was glassy; but these were the only evidences of coolness.

On the 25th ult. the United Gas Improvement Company forwarded a check to the city treasurer of Philadelphia in the sum of $201,520.14 on account of royalties on gas sold by it in that city during the quarter ended December 31, 1907. For the corresponding quarter in 1906 the payment on similar account was $187,145.57.

Professor Edward O'Neill, dean of the department of chemistry, University of California, having been called in by the authorities of Berkely, Cal., to test the quality of the gas being supplied there by the Oakland Gas Light and Heat Company reported that the article was up to every requirement of the standard. In fact, the gas was quite a bit better than that stipulated.

A correspondent in Denver, Col., forwards the following: "The season of rich and rare privileges for the 'bachelor maid' was recently royally ushered in by the giving of a leap-year ball some evenings ago in Cotillion Hall, of the Denver Gas and Electric Company. Over 250 employees of the company and their friends shared the festivities. A feature of the beautiful decorations was the illumination of two large American flags arranged in the shape of stars in the center of the hall. The lights were given a star effect, which was shown to best advantage during the moonlight dance towards the close of the program. Elmer Jackson and A. W. Hahn, two of the representatives of the company, did the work in connection with this artistic effect; this decorative lighting will be made permanent in the hall. The two flower girls, Miss Clara Risley and Miss Carroll Stannard, lavished carnations on every gentleman in attendance. The grand march was led by the secretary of the company, C. N. Stannard, and wife, the treasurer, John T. Brady, and wife, and Miss Ida Conklin and R. F. Bump. The affair was given under the active direction of Miss Conklin, assisted by the following committee: Mrs. W. J. Barker, chairman; Mrs. C. N. Stannard, Mrs. J. T. Brady and the Misses Evits, McKee, Hickman, Bailee, Ridley and Anderson.

40 YEARS AGO

The Springfield (Mass.) Gas Company gained 229 consumers in '87.

The Lancaster (Pa.) Gas Light and Fuel Company has contracted with Messrs. Deily & Fowler for the erection of a gas holder to have a capacity of 200,000 cubic feet.

The San Francisco (Cal.) Gas Light Company was organized in 1852 by Messrs. James and Peter Donahue. When gas was first distributed there consumers paid for it at the rate of $15 per thousand. Now the price is $2.

On account of the bursting of a city hydrant located in North Bridge Street, Poughkeepsie, N. Y., the Poughkeepsie Gas Light Company's plant was damaged to the extent of $1,000. The break occurred at an early hour on the morning of January 26. Is the city responsible for the damage, Brother Tracy?

Danville (Ill.) Reports Progress. Supt. Woodmansee will this season add a 10-inch exhauster to the Danville Gas Company's apparatus. As soon as the thermometer learns how to conquer its sinking spells he will renovate and enlarge the company's office buildings, paying like attention to the workshops. Last year the Danville main system was overhauled, the result being that the works breathed easier, while Brother Woodmansee slept sounder than was the case a twelve months ago. The consumers also betrayed slighter knowledge of certain emphatic words which, although enshrined in the pages of Messrs. Merriam's unabridged edition of Webster's greatest effort are not looked upon with great favor by those whose emotional valves are at rest. Large pipes tend to allay profanity and thus act as preservers of the peace.

60 YEARS AGO

A copy of the "Gas Engineers and Superintendents' Pocket Almanac," issued by the American Meter Company, has been laid upon our table. In addition to illustrated advertisements of the very valuable and accurate varieties of apparatus manufactured by the company, it embodies many formulae and tables of practical value to gas makers.

We have had our attention drawn to the first "General Announcement" of the Cornell University, recently opened at Ithaca, N. Y., and are much struck with the judicious scheme upon which its collegiate course is adjusted. Its board of trustees comprise many of the most prominent men in the State, and augurs the selection of a faculty fully competent to discharge their important duties.

A Page from

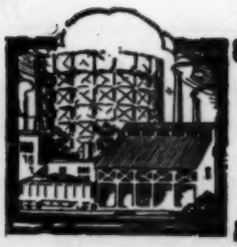
IN the interests of simplifying the work of the gas company, Welsbach has created an unusual instruction card for the purchasers of the Hotzone Self Action Water Heater . . . In a good natured way the folder acquaints the new owner of a water heater with the "do's and dont's" of operation. Already this little folder has aided in the general work of making well-satisfied customers for gas companies . . . The idea itself is indicative of Welsbach's continuous effort to aid its customers in reducing sales resistance and increasing good will. Samples of "Welcome, Member" will be gladly sent on request. Welsbach Company, Gloucester City, N. J. *Offices in Principal Cities.*

Member of American Gas Association

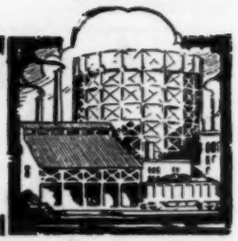
The Reading of the By-laws
As this is a family membership, it is recommended, in the interest of perfect satisfaction, that the family treasurer read aloud to the newly initiated the following by-laws. And thereafter seek their unanimous adoption.
1. No member shall turn on the hot water faucet when cold will suit his purpose just as well.
2. All members shall see that the hot water faucets are turned off tight after using.
3. Any member who discovers a leaky faucet shall report the same to the family manager immediately.
4. All members shall mix cold water with the hot in order to get the right temperature instead of drawing twice as much hot water and then waiting for it to cool.
5. Any member breaking the above rules shall be immediately demoted to the end of the bathroom line.

The **WELCOME MEMBER** *folder is attached to every* *Welsbach* **HOTZONE**

SELF ACTION GAS WATER HEATER



NEWS OF THE GAS INDUSTRY



The Smoke Is Terrible

The Colorado coal strike which started October 18, 1927, is not yet over and it is evident that the city of Denver cannot burn bituminous coal and get away with it, unless smoke consumers are used.

Denver is a mile above the sea level and often there are low lying clouds and as the smoke meets with the clouds it is held, chilled and driven back, not driven away or allowed to float away as happens in local cities near the sea level.

This is a possible explanation, but the fact remains that the smoke pall in Denver is abominable, and it will result, no doubt, in many of the big building owners signing up for natural gas for heating purposes, and the city smoke inspector insisting that all factories and large office buildings which burn coal must place tested and approved smoke consumers. There is no other way, because in addition to the smoke pall there are many who have been taken ill because of deleterious atmosphere.

The Public Service Company is hurrying the natural gas pipe line, natural gas to come to Denver from Amarillo, Tex.

Properties and Testing of Petroleum Products

Recent reports of the Bureau of Mines include a number of mimeographed and one printed document of considerable interest to the gas industry because of their bearing upon petroleum supplies and laboratory testing of petroleum products. These documents include:

The Study of an Intermediate Base Crude Oil, by H. M. Smith. Serial 2837. A Study of Salt Creek, Wyoming, petroleum, with special reference to lubricant fraction.

The Sulphur Content of Commercial Motor Fuels, by A. J. Kraemer, E. C. Kane and C. S. Luce. Serial 2843. Includes numerous analyses.

Prevention of Hydrogen Sulhpide Poisoning in Handling and Refining High-Sulphur Petroleum, by H. C. Fowler. Serial 2847. Includes general discussion of toxicity of hydrogen sulphide and means for treatment of workmen affected thereby.

The Detection of Sulphur in Petroleum and Petroleum Distillates, by F. W. Lane and John M. Devine. Serial 2828. Quantitative test procedure recommended.

Reduction of Breathing Losses from Vapor-Tight Lease Tanks, by Ludwig Smith. Serial 2834. General discussion of the problems of storing volatile liquids.

Analyses of Crude Oils from the West Texas District, by A. J. Kraemer, Peter Grandone, and C. S. Luce. Serial 2849. Summarizes analyses made.

Railroad Fuel Oil Consumption in 1926, by Arthur Huber Redfield. Circular 6049. Statistical summary.

Sources and Distribution of Major Petroleum Products, Atlantic Coast States—1926, by E. B. Swanson. Circular 6050. A statistical summary.

Petroleum Statistics, October, 1927, by G. R. Hopkins. A complete statistical summary of production by fields, derivatives from refineries, and general data regarding marketed products.

United States Government Master Specification for Lubricants and Liquid Fuels, and Methods for Sampling and Testing. Technical Paper 323B. Official Government requirements regarding purchases and test procedure for all classes of petroleum derivatives.

Comparison of Oils Derived from Coal and from Oil Shale, by Joseph W. Horne and Arthur D. Bauer. Serial 2832. A discussion of the yields and properties of the liquid derivatives produced from retorting of oil shale, lignite and sub-bituminous coal, particularly types available in the Western States.

Increased Benzol Demand in Germany

Germany's self-sufficiency in benzol has been strikingly changed recently. Imports of this light oil product from the United States are now being required regularly in order to supply the needed material for blended motor fuel use. Until 1926 the import of benzol by Germany from the United States was negligible, but in that year approximately 14,000 tons were purchased on the American market, and during 1927 nearly 50,000 tons were so bought. The total import requirement is considerably in excess of 100,000 tons and apparently growing rapidly because of the increasing use of benzol and alcohol admixture with gasoline.

British Ammonia Production Largely Increased

A consular communication from England reports a definite decision of Synthetic Ammonia and Nitrates, Ltd., to build two new synthetic plants, each having a capacity for making 165 tons per day of liquid ammonia. The ultimate products marketed are expected to be ammonium sulphate, ammonium nitrate, nitro-chalk, ammonium dicarbonate, and other chemicals and fertilizer constituents. Capacity operation is expected by 1930, at which time this company will have an output equivalent to 750,000 tons per year of ammonium sulphate. This company is a subsidiary of Imperial Chemical Companies, Ltd., the British chemical trust. It is understood that this concern anticipates entry into world ammonia markets on a very large scale, competing aggressively for peacetime fertilizer sales with Chilean nitrate and by-product ammonium sulphate.

Voters Refuse to Let Go of Municipal Plant

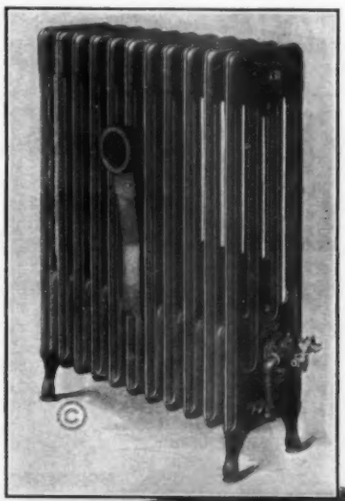
Although the North Continent Utilities Corporation of Chicago agreed to furnish the city of Raton, New Mexico, with either artificial or natural gas within two years from the time of sale, a special election was held at Raton, January 9, relative to the question of selling the municipal owned electric plant to the North Continent and the voters killed the sale by a vote of 1,285 to 130.

With its promise to supply gas it was also outlined that the electrical service would be improved, but deaf ears were turned to all of it.

Natural Gas for One Hundred and Forty Cities

Natural gas from Pampa in the Amarillo, Texas, field to Wichita, Kansas, in the 267-mile long pipe line of the Cities Service Company, started flowing December 31. This gas will serve about one hundred and forty cities in Oklahoma, Kansas and Missouri, and compressor stations will be at Pampa, Mooreland, Oklahoma, and Wichita. The pipe line will cost about $15,000,000.

STEAM FOR HEAT — GAS FOR FUEL



How It's Done By Clow

Clow Gasteam Radiators supply real steam heat, with all its advantages and none of the difficulties.

Because Clow burners are enclosed, the fire hazard is eliminated. Clow Radiators are approved by the Underwriters' Laboratories.

Little or no servicing is required on Clow Gasteam Radiators. They are solidly built, permanently attached, and cannot be accidentally upset.

Clow Gasteam Radiators can be used for intermittent heating in cold places—freezing the water will not hurt them.

Clow Radiators spread heat over a large area, as is necessary in almost all cases of commercial heating, rather than intense heat immediately surrounding the radiator.

Clow has been building Gasteam Radiators for 20 years. The annual sales are now bringing more than a billion cubic feet of new heating load to the gas companies each year.

Warehouse stocks are maintained at 21 distributing points.

The Clow Vented Radiators end the moisture problem that has held back gas heating in many sections of the country.

Our new Clow Gasteam Vented Catalog should be read by officials of Gas Companies, architects, steam fitters, plumbers and others interested in the proper venting of any gas appliance.

Write for your copy today.

$1,500 Worth of Gas Business Every Year — *To Raise the Off Peak Load*

The seven stores in this basementless block are heated by Clow Gasteam. Their annual consumption amounts to over $1,500.

This $1,500 worth of commercial heating with Gasteam means a larger load, and a steadier load for the gas company. For the commercial load comes mainly *after* the "breakfast" peak—and usually goes off before the "evening" peak is at its height.

Clow Vented Radiators are ending the moisture problem that has held back gas heating in many sections of the country. And with such help, Gasteam is easy to sell.

Every Gas Official should read our new catalog which illustrates the wide possibilities of Clow Gasteam. Send for your copy—no obligation.

JAMES B. CLOW & SONS
201-299 North Talman Avenue, Chicago

CLOW GASTEAM

A. G. A. and Underwriters' Laboratories Approved.

STOCKED IN EVERY SECTION OF THE COUNTRY

Natural Gas Pipe Line Goes Merrily On

The natural gas pipe line from Amarillo, Texas, to Denver is progressing nicely. At Pueblo the Pueblo Gas & Fuel Company is planning to receive this gas and will spend about $250,000 for additional pipe lines, booster station, etc., and while it has several routes from the main line into the city, the selection will be left to the decision of a meeting of eastern engineers, based upon the probable future growth of the city.

A. M. Talbott is the local manager.

Accurate Gas Burette Devised

The Bureau of Standards has developed a new burette for accurate laboratory measurement of gas volumes without gas connection to a compensator tube. This apparatus is applicable to high-precision analyses or physical testing. Persons interested should procure a copy of Bureau of Standards Scientific Paper 559, entitled "A Burette for the Accurate Measurement of Gas Volumes Without Gas Connection to a Compensator," by E. R. Weaver and Martin Shepherd.

Government Specifications Indexed

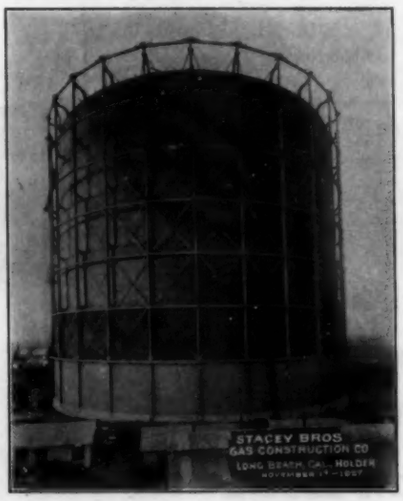
Purchasing agents generally will find it very valuable to have Circular 319 of the Bureau of Standards, which gives an alphabetical and numerical list of all Government Master Specifications. This document enables one to identify the requirements which the Government uses to supervise its own purchases of a great variety of commodities. Several hundred specifications are indexed, all of which are available, either by purchase at nominal cost or free on request to the Bureau of Standards.

Proposed Rates for South Bend

Reduction in gas rates at South Bend and Mishawaka, Ind., are provided in new optional rates schedules submitted by the Northern Indiana Public Service Company and approved January 7 by the Indiana Public Service Commission. The new gas schedules provide a $1 service charge, minimum monthly charge, and a rate of $1 per 1,000 cubic feet for the first 2,000 feet and 90 cents for all over 2,000 feet. For heating, a charge of 70 cents a thousand for all over 20,000 is fixed.

Long Beach Gas Holder Is Completed in Record Time

The City of Long Beach, Cal., awarded a contract for the construction of a 10,000,000 cu. ft. gas holder to the Stacey Brothers Gas Construction Company of Cincinnati, Ohio, on May 5, 1927. During the second week in December last the completed holder and compressor station were turned over to the city, thereby setting up a new time record for the erection of a holder of this capacity. Time allowed for its completon was eight months, and the work was finished in seven. William A. Miller, chief engineer for Stacey Brothers, was in charge of the Long Beach project.



Two noteworthy feats marked the construction of the holder. First, the excavation and construction of the foundation in exactly twenty-two calendar days, and second, the completion of all the steel work in five and a half months. The former task necessitated the removal of 17,600 yards of dirt and the placing of 2,880 cubic yards of concrete.

The completed holder covers approximately 60,000 square feet, or nearly one and one-half acres. The weight of the steel used in the construction is 4,400 tons. The tank contains a total of 1,060,000 large and small rivets. To fill the steel tank of the holder requires 17,200,000 gallons of water.

Walter R. Fleming, public service director for the city of Long Beach, addressed a highly commendatory letter to Mr. Miller of the constructing firm, complimenting him upon early completion of the project without injury either to workmen or property during construction.

Formal acceptance of the completed gas holder by the city council came on December 13. By terms of the contract entered into between the city and Stacey Brothers a penalty of $500 a day would have been exacted by the city for each day over the contract period during which the holder remained uncompleted and unaccepted.

Production Conference Planned

Recent meetings of the Chemical, Water-Gas and Carbonization Committees of the American Gas Association have brought out almost unanimous demand for another Production Conference to be held in the late spring of this year. The first of these conferences was held in Detroit at the end of May, 1927. It is anticipated that a similar conference would be equally valuable to the engineers and chemists interested in the production problems of the industry and a tentative plan has been perfected to hold such sessions during the latter part of May or early June at some place still to be selected.

Later announcement will be made as to the exact time, place and program. Arrangements are being made by a special committee under the chairmanship of H. H. Himsworth, with whom are working two representatives of each of the three technical committees sponsoring the gathering. A three-day session is contemplated with one day devoted primarily to water gas, one to carbonization and coal gas, and one to chemical plant control and other chemical problems.

Ohio Gas and Oil Men's Association Affiliates With A. G. A.

The Ohio Gas and Oil Men's Association is now affiliated with the American Gas Association, according to announcement made by Oscar H. Fogg, president of the A. G. A.

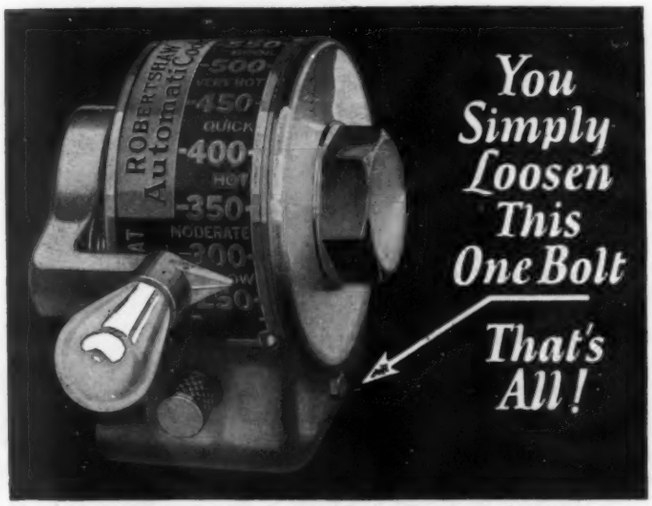
The Ohio association, which has a total membership of 1,700 and is one of the most active state organizations in the country, is the sixteenth group to be added to the role of affiliated A. G. A. associations by action of the executive board.

John J. McMahon, of the East Ohio Gas Company, Cleveland, Ohio, is president of the Ohio association, and Wm. H. Thompson, 811 First National Bank Building, Columbus, Ohio, is secretary-treasurer. The official address of the association is that of the secretary-treasurer.

Established July 10, 1918, at Columbus, the Ohio association has been of widespread influence and of material aid to the oil and gas industries of the state. The annual conventions have been especially well attended, and the pro-

The "B" Type Puts Confidence in the Gas Range Sale

ROBERTSHAW TRADE MARK
AutomatiCook



The "B" Type AutomatiCook—Guards the future

The Gas Company or Stove Dealer Can Now Guarantee Permanent Oven Heat Control

No matter what might happen in 10 years—20 years—the "B" Type AutomatiCook insures continuous Thermostat control as long as the range is in service.

Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Simply loosen one bolt, replace the thermostat and tighten the bolt.

Takes just forty seconds to do the job!

The "B" Type AutomatiCook on a gas range enables the stove dealer to satisfy any immediate or future complaint with a minimum of expense and service.

—And while all Robertshaw Thermostats are particularly designed to outlive the gas range, this remarkable quick replacement feature will completely eliminate any doubt in your customer's mind concerning the life of the Thermostat.

Write for complete Information

ROBERTSHAW THERMOSTAT COMPANY

YOUNGWOOD, PA.

"Thermostats since 1899"

grams have been outstanding for their valuable papers and contributions to the industries' advancement. More than 1,000 were registered at a recent convention.

Great Gas Developments in Texas

The greatest gas development, perhaps, of any state in the nation has been enjoyed by Texas during 1927, the Lone Star State now sharing to a large measure in the general interest now attaching to the oldest of the public utility services.

The Lone Star Gas Company, to mention but one of the concerns operating in the state, has approximately 3,200 miles of main pipes in Texas and Oklahoma and is serving almost 200 cities.

The development has not been confined to certain districts of the State, but all over the State; in West Texas, East Texas and South Texas there has been gas development. Wood piles and coal stoves have been done away with in a score of towns for the cleaner and more convenient fuel, and many of them now are making bids for industries.

There are more than 8,000 miles of gas mains in Texas, with the mileage being increased almost daily. This is being increased especially in West and South Texas. The development is the greatest in South Texas, where the Dixie Pipe Line Company has 750 miles of mains, the Houston Pipe Line Company has more than 400 miles, the La-Tex about the same mileage, the Houston Gulf Gas Company with upwards of 600 miles, and the West Texas Gas Company, a subsidiary of the Prairie Oil & Gas Company, with more than 250 miles.

Gas is poured into the mains from fields all over Texas, including Webb, Duval, Potter and Coleman counties. Geological studies indicate there is to be much greater development, according to Frank L. Chase of the Lone Star Gas Company.

New Coke Report Available

The annual Mineral Resources Division report from the Bureau of Mines, entitled "Coke and By-Products in 1925," has just been issued. This document gives a complete and detailed summary of statistics for by-product and beehive coke and all coal by-products produced in connection with oven operation in the United States. Copies of the report are available only by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15 cents per copy, payment for which must be made in advance (stamps not accepted).

Thirty-six Producing Gas Wells Sold

William F. Morgan, of San Antonio, Texas, for a consideration of $934,000, has sold to the Houston Gulf Gas Company sixteen producing gas wells and 60,000 acres in and near the Refugio gas field, and twenty producing wells and 35,000 acres in the Laredo district. It is one of the biggest deals of the year in Texas gas circles.

Most of the consideration was cash. The properties sold include those of William F. Morgan, Inc., and the Coast Gas Company, the stock of which was held by William F. Morgan, Inc. Morgan, beginning January 1, became associated with the Houston Gulf Gas Company, which is controlled by the E. L. Phillips interests of New York. The same interests are building a gas line from Northwestern Louisiana to Houston.

Of the property sold by Morgan, 51,000 acres are in the Welder ranch lease, San Patricio County, where a wildcat test is being started. There are small holdings in the Adams gas field, Medina County, also.

The properties sold by Morgan represent an accumulation of several years. His first valuable holdings were in Jim Hogg County.

Wants Natural Gas

Regardless of the fact that the city of Colorado Springs, owners of its gas plant, refused to sell the plant to the Public Service Company of Colorado, the Public Service promising to substitute natural gas for artificial just as soon as the pipe line was completed from Amarillo, the towns of Ivywild, Canon and Broadmoor, just outside of the city limits of the Springs, have asked the Public Service Company to arrange to serve them with natural gas at the earliest possible moment.

Improvements At Gas Plant

The Otero County Gas Company, which serves La Junta, Swink and Rocky Ford with artificial gas, the plant being located at La Junta, Colorado, having been purchased by W. B. Foshay Company of Minneapolis, improvements and enlargements are in order, and Engineer A. E. Shippe of the Foshay Company was in La Junta during January supervising the work. About $25,000 will be spent.

When asked relative to connecting up with the Amarillo Texas-Denver pipe lines so as to serve the Otero County folks with natural gas, Mr. Shippe stated that the pipe line was a full thirty miles away and would not be considered at this time.

Employees Awarded Meritorious Service Medals

Twenty-six employees of the Consolidated Gas Company of New York and Affiliated Gas and Electric Companies have been made the recipients of the first award made of those combined companies' Meritorious Service Medals, which will be awarded every year hereafter in recognition of outstanding acts of heroism and the advancement in art or science to the gas and electric service. The distinguishing medals are of gold, silver and bronze.

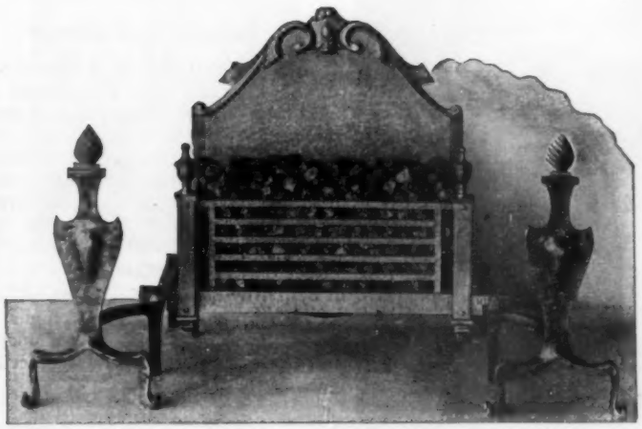
Two men were each awarded a silver medal for saving lives at great personal hazard to themselves—John Harry Cherdron of the New York and Queens Electric Light and Power Company, and Henry Charles Lang of the Northern Union Gas Company. Eugene A. Butler, of the New York and Queens Gas Company, was awarded a bronze medal for saving a life in his line of duty. Twenty-one medals were awarded to employees who had saved lives during 1926; three received meals in connection with the potential saving of life and prevention of damage to or loss of property; one for the prevention of damage to or loss of property, and one was awarded a medal for a contribution he made to the design, construction, operation and maintenance resulting in an improvement of electric service. Louis Melone, an employee of the Westchester Lighting Company, lost his life in July, 1926, when he succumbed to flames and smoke in an effort to save fellow workmen and property in the Yonkers gas plant.

The awards were made by the General Committee on Meritorious Service Award, of which Mr. George B. Cortelyou, president of the Consolidated Gas Company of New York, is chairman.

Purchase Approved

Approval of the purchase at a receiver's sale of the property of the Mid-States Utilities Company by the General Utilities Company has been granted by the Indiana Public Service Commission. The sale was made, according to the terms of a recent court order which authorized the issuance of $150,000 in preferred stock by the General Utilities Company to be exchanged for preferred stock in the Mid-States Company, the issuance of $65,000 in notes to liquidate the debts of the latter company, and the issuance of $75,000 in common stock of which only twenty shares may be sold, the remainder to be retained until further orders of the commission.

Hard to Sell Heaters This Season?



Coalfire No. 13—List $50.

Well, Maybe But Not Homestead Fires

Just burn them in the showroom where your customers can see them and they sell themselves

They are so obviously appropriate for fireplaces,
—so natural in appearance,
—so different in every way that people want them.

Woodfire No. 03—List $49.

And when people want something, they buy it. You don't have to sell them.

HOMESTEAD HEATER COMPANY, Inc.

Selvage Street and Fabyan Place WALTER KENNEDY, PRESIDENT **Newark, N. J., U. S. A.**

Illinois Committee on Public Utility Information Holds Meeting

The quarterly meeting of the Illinois Committee on Public Utility Information, held in the Peoples Power Company auditorium in Moline, Ill., was attended by fifty members from all over the State. John F. Gilchrist, vice-president of the Commonwealth Edison Company, Chicago, presided, and talks were made by R. B. McDonald, president and general manager of the Peoples Power Company, Moline; Robert Hallenberg, director of public relations, Illinois Northern Utilities Company, Dixon; George R. Jones, vice-president of the Public Service Company of Northern Illinois, Chicago; Bernard J. Mullaney, vice-president of the Peoples Gas, Light and Coke Company, Chicago; Joseph Carmichael, president of the Iowa Committee on Public Utilities Information; Miss Bertha Bidwell, president of the Illinois League of Women Voters, and J. H. Corcoran, district manager of the Illinois Bell Telephone Company, Rockford.

Personals

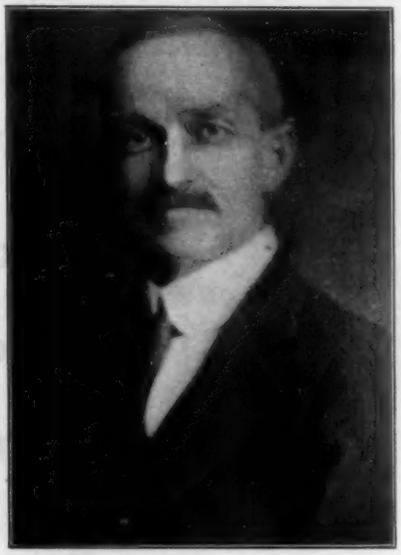
Leckie Appointed Gas Professor at Purdue

R. B. Leckie, Orange, N. J, now connected with the Semet-Solvay Company of New York City, has been appointed professor of gas engineering at Purdue University, Lafayette, Ind., it has been announced by Dean A. A. Potter of the school of engineering. He will arrive February 1 to assume his duties in a new phase of work undertaken by the school of chemical engineering as a result of the gift last fall of $10,000 annually for five years by the Indiana Gas Association to the university.

Besides giving a series of public and special lectures pertaining to the manufacture of gas, he will spend considerable time in Indiana gas plants studying their problems and giving them the benefit of his experience. He was graduated from the Glasgow Technical College with a diploma in gas engineering. He also holds honors in gas engineering from the City and Guilds of London Institute. In 1912 he received a gold medal from the Scottish Gas Association for the best paper in its session that year.

Herman Russell Elected President of the Rochester Chamber of Commerce

The recent election of Herman Russell, vice-president of the Rochester Gas and Electric Corporation, to the presidency of the Rochester Chamber of Commerce indicates Rochester's confidence in Mr. Russell's ability and, indirectly, its confidence in the utility which Mr. Russell represents.



Herman Russell

He is a graduate of the University of Michigan in the class of 1898. He received a master's degree in 1900 for post-graduate work in chemistry and gas engineering. Shortly after that he entered the employ of the Detroit Gas Company and in 1902 was appointed assistant superintendent. Later he became superintendent of the gas manufacturing department of the San Francisco Gas and Electric Company, and in 1904 he was appointed assistant superintendent of the gas manufacturing department of the Gas and Electric Company of Cincinnati. Mr. Russell came to Rochester in 1905, where he has remained as an executive of the Rochester Gas and Electric Corporation for over 22 years.

Mr. Russell rose from the position of assistant superintendent of the company's gas plant in 1905 to the rank of vice-president in 1927, through the following positions: He was appointed superintendent of gas manufacture in 1908, assistant general manager in 1914, general manager in 1919, and was made a vice-president in 1922. He is an officer and director in numerous Rochester banks and other organizations.

Demlow Leaves Illinois Power & Light

E. K. Demlow, for 25 years in the service of the McKinley interests and the Illinois Power & Light Company, Champaign, Ill., has resigned, effective January 1, to become associated with Johnson Bros. refrigerator department in Champaign and territory. P. D. Finnegan will succeed him in the Illinois power plant, where he is superintendent of the gas department of the company. Mr. Demlow has held that position 15 years.

Insley Elected Director

William H. Insley, well known manufacturer of this city, was elected a director of the Citizens Gas Company here, succeeding the late Alfred F. Potts, at the last meeting of the trustees of the company. Other directors re-elected were J. I. Dissette, G. A. Efroymson, Edgar H. Evans, J. H. Hooker, H. H. Hornbrook, C. L. Kirk, John R. Welch and Franklin Vonnegut.

No discussion of Mayor L. Ert Slack's proposal to "save the gas company for the citizens of Indianapolis" was taken up, trustees announced following the meeting.

Manatt Made Manager

C. W. Manatt, formerly of Fairbault, Minn., who has been acting assistant manager at the Yankton, S. D., Gas Company plant for several months, has been made manager. He succeeds Charles Smith, who has retired after long service to enter the hotel business.

Obituary

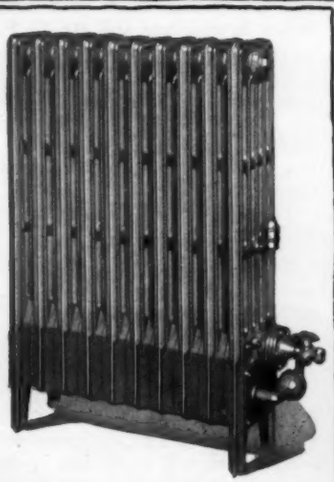
Ward Wooldridge Dead

Ward Wooldridge, former superintendent of the Western Light & Power Company at Boulder, Colorado; Cheyenne, Wyoming, and Trinidad, Colorado, died at Hollywood, California, January 5.

Death of Philip Mueller

Philip Mueller, of Mueller Company, Decatur, Ill., widely known in the plumbing trade, died at his home Monday morning, January 23, following a stroke of apoplexy on the morning of January 19.

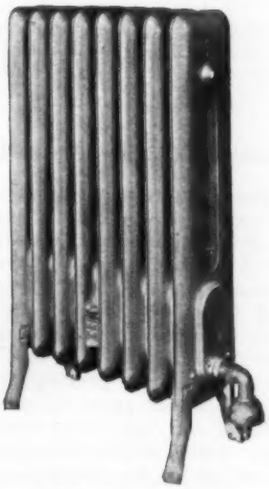
He was born October 16, 1859, and at an early age joined his father and his older brother, Henry, in the plumbing business. He became a partner in the business in 1886, and has since been actively engaged in the Mueller Enterprises in Decatur, as superintendent of



The A. G. P. Gas-Fired Steam Radiator (Corto Design)

THE BLUE STAR SEAL

The testing laboratory of the A. G. A. has awarded this symbol of approval to all A. G. P. Gas Radiators.



The A. G. P. Warm Air Gas Radiator

TESTED *and* APPROVED

The complete line of A.G.P. *Gas Radiators!*

AFTER exhaustive tests, the American Gas Association's testing laboratory has fully approved the complete line of A.G.P. Radiators—both warm air and steam, in every size and height.

This sweeping approval justifies the widespread confidence which gas companies and heating contractors have in the *performance* of A. G. P. Radiators.

But these radiators are not only well-made pieces of equipment—they have a definite place in your scheme of selling. Their *appearance* instantly recommends them. Their *price* is right. They fill certain heating needs that nothing else can meet so inexpensively and well.

We have prepared attractive owner sales literature on these radiators which you can profitably distribute among your customers.

Put these radiators on your floor! A sample of each will enable you to demonstrate their usefulness as nothing else can. The dealers and gas companies who *show* these radiators are selling them fastest!

* * *

Send today for complete specifications, weights, prices, etc. Ask also for our interesting direct-mail literature.

A.G.P. GAS RADIATORS

AMERICAN · GAS · PRODUCTS · CORPORATION

376 *LAFAYETTE STREET · NEW YORK CITY*

the factory, works manager and first vice-president.

Surviving him are three brothers and his family, consisting of his wife and six children.

Gas Machinery Company President Dies

Mr. Pierre Plantinga, president of the Gas Machinery Company of Cleveland, Ohio, died of pneumonia January 17, 1928, at St. Luke's Hospital, Cleveland.

Mr. Plantinga was born in Bolsward, Holland, December 21, 1871, was educated on the Continent of Europe and came to the United States in 1893.

After attending the World's Fair in Chicago, he became associated with the gas industry and has always remained intimately connected therewith.

He was one of the incorporators of the Gas Machinery Company in 1902, and was a member of the American Gas Association, American Society of Mechanical Engineers, Cleveland Athletic Club and Willowick Country Club.

Mr. Plantinga is survived by his widow, Gertrude Plantinga, and by three children, John G. Plantinga, Mrs. Katheryn Botten and Mrs. Claire Hale.

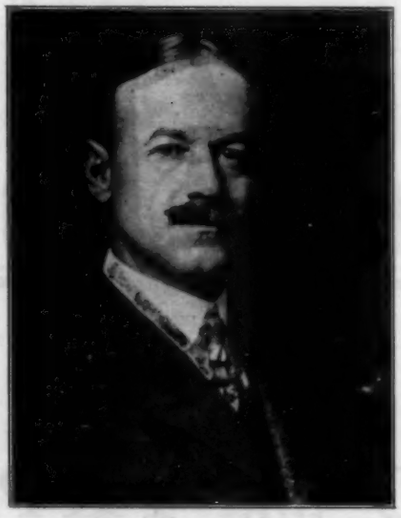
Trade News and Construction

Four Widely Known Firms Combine to Form United Engineers & Constructors, Inc.

The largest engineering and construction company in this country has been organized in Philadelphia, according to a statement issued by Arthur W. Thompson, president of the United Gas Improvement Company. "Four firms, widely known in this and other countries, have combined their interests and organized the United Engineers and Constructors, Incorporated," said Mr. Thompson. "These companies are the U. G. I. Contracting Company, Philadelphia; the Public Service Production Company, Newark; Dwight P. Robinson & Company, Inc., New York, and Day & Zimmermann Engineering & Construction Company, Philadelphia. Headquarters of the new company will be in Philadelphia, with offices in New York, Newark, Chicago, Los Angeles, Atlanta, Houston, Pittsburgh, Montreal, Buenos Aires and Rio de Janeiro."

Dwight P. Robinson is president of the company. The directors are Arthur W. Thompson, president the United Gas Improvement Co., chairman; Dwight P. Robinson; Thomas N. McCarter, president Public Service Corporation of New Jersey; Samuel T. Bodine, chairman, board of directors, the United Gas Improvement Company; Paul Thompson, a vice-president of the United Gas Improvement Company and president of the Philadelphia Gas Works Company, and John E. Zimmerman, president of Day & Zimmermann, Inc.

The new company is launched with contracts in hand amounting to more than $100,000,000.



Dwight P. Robinson

Dwight P. Robinson has for thirty-five years been engaged in bringing large construction enterprises to completion with speed and economy. He was born in Boston, May 1, 1869. In 1890 he was graduated from Harvard, and two years later from the Massachusetts Institute of Technology, where he obtained his electrical engineering education.

With the work now under way, including the construction of large dams for the Government on the Ohio River, extensive hydro-electric development on the Housatonic River, Connecticut, important work in South America and Spain, and large office and apartment buildings in New York and other cities, the United Engineers and Constructors, Incorporated, starts business with an unusual program.

Subsidiary Corporation Formed

Bastion-Morley Company, LaPorte, Ind., have formed a subsidiary corporation to take over the sale of a new line of gas and electric water heaters. The new corporation is called "The Gas & Electric Heater Co." Mr. George W. Wood is president and Mr. C. F. Laibel vice-president of the newly organized company.

In their announcement they state that the line will be complete, containing storage gas water heaters of all capacities, insulated, uninsulated, automatic, unautomatic.

The head office will be at LaPorte, Ind.

Western Gas Constr. Co. to Install Welded Steel Purifier Box in Indianapolis

Contract has been awarded for furnishing one welded steel purifier box of four compartments carried on steel supports. Each compartment will be 36 feet by 63 ft. by 13 feet deep with steel plate covers. The purifier will be equipped with gantry crane carrying an oxide elevator and conveyor, bottom oxide dump doors, two layers of trays, heating coils and 30-inch circle series connections with "Western" DF Reversing Valves to be erected at Prospect Street plant of the Citzens Gas Company, Indianapolis, Ind.

Contract has been awarded for furnishing one four-foot water gas machine, equipped with bypass arrangement, to be erected for the Village of Lebanon, Lebanon, Ohio.

Semet-Solvay Eng. Corp. to Install Steere Automatic Charging Machine in Richmond—Other Contracts Received

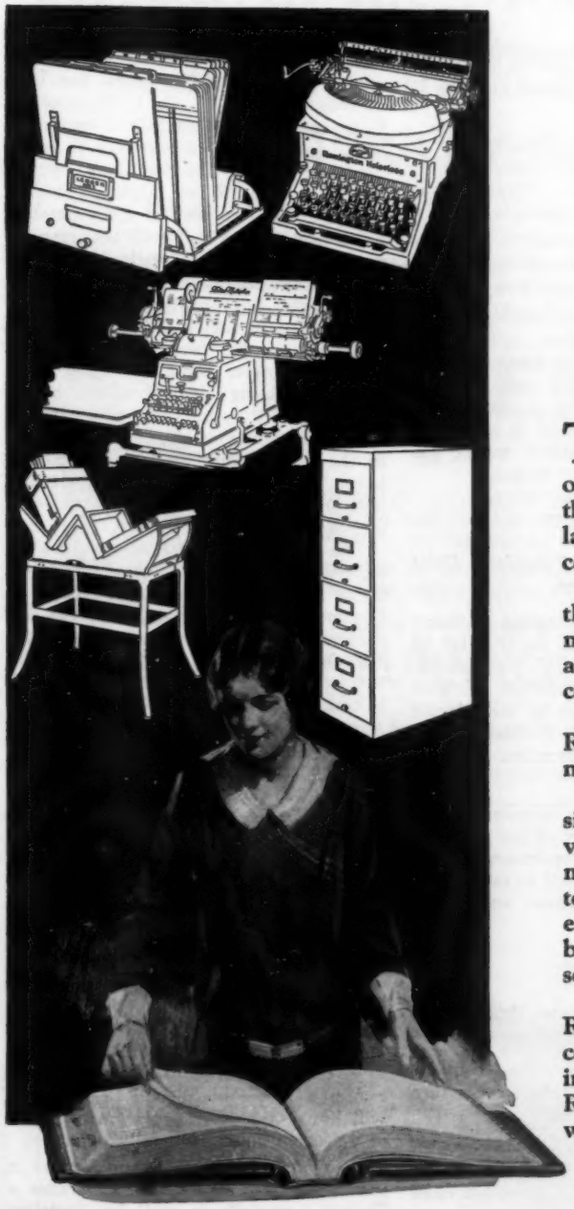
The municipal gas plant serving Richmond, Va., has ordered a Steere automatic charging machine and a grate poker for one of its water gas generators.

The Semet-Solvay Engineering Corporation is also furnishing the Richmond plant with sixteen stacks of Steere cooling coils. Each bank will contain twenty-six pipes, each twenty feet long. They are built of welded steel and sherardized to prevent corrosion.

The Fulton (N. Y.) Fuel and Light Company is being furnished with scrubber grids for a washer cooler installation. These are of the Steere standard type. They are built of soft white pine, fastened with sherardized bolts. They present a maximum scrubbing surface per cubic foot of volume.

The Atlantic City (N. J.) Gas Company has ordered an R. S. De-Emulsifier with a capacity for treating 5,000 gallons of tar emulsions per batch. The equipment will be used to dehydrate emulsions to a three

Baker Vawter *and* Kalamazoo combined



THESE two successful companies have long pioneered in the development of Loose Leaf methods. Each has made outstanding contributions to the simplification of business practice, reducing labor, saving time and cutting costs through the correct application of proper equipment.

Baker Vawter and Kalamazoo have now taken their place with other leaders of the office equipment industry. As part of Remington Rand they are making and will continue to make even greater contributions to business progress.

Business men have already learned to look to Remington Rand for practical equipment and economical methods.

One hundred and ten trained engineers are using six research laboratories to develop and perfect devices for today's needs. Fifteen thousand skilled workmen in twenty-eight large plants construct equipment to their specifications. And to insure full value for every dollar invested in Remington Rand equipment by the business man, four thousand trained representatives sell and service these products.

When it's loose leaf for any purpose, call the Remington Rand man. He will bring to you the combined experiences of the two recognized leaders in the loose leaf field, Baker Vawter and Kalamazoo. Remington Rand Business Service Inc., 374 Broadway, New York.

Remington Rand

BUSINESS SERVICE *INC.*

REMINGTON · KARDEX · RAND · SAFE-CABINET
DALTON · POWERS · KALAMAZOO
BAKER-VAWTER · LINE-A-TIME
LIBRARY BUREAU

per cent content or less, making the tar a desirable commercial product.

The Long Island Lighting Company's plant at Bay Shore will be equipped with Steere welded steel pipe and fittings. E. L. Phillips & Company, New York, has ordered from the Semet-Solvay Engineering Corporation a quantity of 16, 20 and 30-inch pipe and fittings with Van Stone flanges. The larger sizes of pipe will have their seams electrically welded both inside and out.

The Combustion Engineering Corporation has specified a Steere arc welded steel purifier for the new low temperature carbonization plant it is building at Piscataway town, N. J. It will be erected in the spring by the Semet-Solvay Engineering Corporation.

The purifier will be 28 feet x 70 feet x 12 feet 6 inches in size, and of the elevated type. It will have three compartments and two layers of oxide trays. A gantry crane will handle doors and will also carry an oxide elevator and screw conveyor for filling the box. Spent oxide will be removed through four bottom dump doors under each compartment.

The purifier will be equipped with a 20-inch manifold of Steere welded steel construction and will have 15 Steere gate valves. The capacity will be 4,000,000 cubic feet of gas each 24 hours.

Gas Machinery Co. to Build Breeze Collectors

The Springfield Gas Light Company of Springfield, Mass., has awarded contract to the Gas Machinery Company of Cleveland, Ohio, for three breeze collectors for the stacks of their water gas apparatus.

These three breeze collectors, with the one formerly ordered from the same company, as a trial order, will fully equip the gas plant at Springfield, provide cleaner yard, plant and holder cups, and eliminate breeze and dust nuisance in the neighborhood.

The Traverse City, Mich., Gas Company, has placed an order to furnish and erect sectional silica retorts and settings for two benches of sixes.

These benches are of the recuperative type, and of the latest design of approved construction.

Changes in Hoffman Heater Company Personnel

Several changes in the officers and personnel of the Hoffman Heater Company, Louisville, Ky., became effective January 3, 1928.

Mr. John G. Dorn, first vice-president, and who has for many years been a director of the company, became president.

Mr. O. P. Simler, vice-president and formerly general manager of sales, returns to his former position, as well as general manager.

Mr. R. W. Johnson, formerly district manager of the Chicago office, is now attached to the general office staff at Louisville as assistant manager.

Mr. C. I. Baker has returned to the general office staff and will again take up his former duties as chief engineer.

Mr. O. P. Simler, who returns to the company as vice-president and general manager, is one of the best known water heater men in the country. He has been associated with the water heater manufacturing business for over 20 years and has a very wide acquaintance among gas men all over the United States.

Beaumont Mfg. Co. Transfers Chief Engineer

The Beaumont Manufacturing Company of Philadelphia announces the transfer of its former chief engineer, L. O. Hassler, to their Western headquarters, Strauss Building, Chicago, where he will devote himself to sales of their products in the Chicago territory under direction of H. E. Birch.

William P. Alexander who resigned from their organization in May of last year has returned to their sales department and as formerly will devote himself to sales duties in the Philadelphia, Baltimore and Washington district.

Large Shipbuilding Co. to Manufacture Heat Transfer Equipment

The Staten Island Shipbuilding Company has formed a division for the manufacture of heat transfer apparatus.

These products are not a new line with the company. This type of equipment has been manufactured at the plant for more than thirty years.

The plant is exceptionally complete with well organized and maintained shops to produce either plate work, castings, machine work, boiler work, forge work or welded products.

The personnel of Heat Transfer Products, Inc., consists of men widely known for their achievements in the industry. Request for engineering data and estimates on any products within the scope of heat transfer equipment will be gladly furnished by this company. The New York address is 90 West Street, Room 509, New York City.

U. G. I. Contracting Co.'s Activities

The County Gas Company, Atlantic Highlands, N. J., is preparing to make extensive additions which, upon their completion will greatly improve the capacity and facilities of the plant. The contract for all of the work has been awarded to the U. G. I. Contracting Company and will include a two-story brick and reinforced concrete fireproof service building, 125 feet long by 103 feet wide and 73 feet high. The first floor will have an area of approximately 6,600 square feet and will be arranged to house an office as well as a garage of 26 cars capacity, and repair shop. The second floor likewise will have an area of approximately 6,600 square feet and will provide facilities for a store room and meter shop. Complet heating and lighting equipment will be installed as well as outside fire escapes.

A pump house of similar construction to the service building will be built to house a deep well pump. This house will be 12 feet by 12 feet by 12 feet 6 inches high.

The present purifier house will be rebuilt to an area of approximately 50 feet by 26 feet, and will house a new U. G. I. cone top carburetted water gas apparatus with daily capacity of about 3,000,000 cubic feet. The apparatus will be of the latest type, which includes full hydraulic operation, U. G. I. Model B Automatic Control, Chrisman Cycle and exhaust steam operating connections.

Auxiliary to the apparatus there will be installed a 172 H. P. Steam Turbine Blowing Plant, capable of delivering the necessary air blast to the set, an electric monorail fuel handling system and a hydraulic pumping system with pumps, tanks and piping.

To take care of the gas as made there will be installed a 9-foot U. G. I. high duty condenser with its connections, a 21-foot diameter circular steel purifier, the relocation of a present 21-foot purifier and a seven valve manifold for these purifiers.

A new meter house will be built and will house a rotary displacement meter of 3,500,000 cubic feet daily capacity.

To conserve exhaust steam for use in the carburetted water gas apparatus a Smoot Accumulator will be installed with the necessary regulating devices, etc. By its use large savings will be possible, as the exhaust from the various steam using units of the plant is stored and delivered to the carburetted water gas apparatus under low pressure for gas making, instead of being permitted to escape into the atmosphere.

All overhead and underground connections required for the above equipment are included in the contract.

Recent orders have been placed for Smoot accumulators by Semet-Solvay Engineering Corporation and County Gas Company, Atlantic Highlands, N. J.

Repair in the Modern Way

Retorts, Jamb Joints, Furnace Walls, Arches and Baffles Should Be Repaired With the

QUIGLEY GUN

The Quigley Refractory Gun fills cracks, repairs retorts, jamb joints of coke ovens, furnace walls, arches, baffles, etc.
It shoots the plastic mixture with great velocity so that it sticks, where hand troweled or rammed-in applications might fail to hold.
The Quigley Gun also makes hot patches.

Shooting Hytempite into Jamb Joint with the Quigley Refractory Gun.

HYTEMPITE

(Reg. U. S. Pat. Off.)

HYTEMPITE is used by hundreds of Gas Companies for laying up firebrick, (and when mixed with crushed old firebrick or Ganisand) for patching and repairing refractory linings, making special shapes and tile, etc.

The mixture of Hytempite and crushed old firebrick applied to wall or joint with the Quigley Gun makes certain an everlasting gas tight surface.

Keep a drum of Hytempite in the retort house or Boiler Room for quick repairs

QUIGLEY FURNACE SPECIALTIES CO., Inc.

26 CORTLANDT STREET NEW YORK

Quick Service from Stock in Every Industrial Center

SUPERIOR

Gas Meters
Provers
Service
Cleaners
Diaphragms

SUPERIOR METER CO.
167 - 41st Street
Brooklyn, N. Y.

In connection with the new apparatus which it is installing for the Iowa Electric Company, at Atlantic, Iowa, the U. G. I. Contracting Company has further been commissioned to furnish a blast pipe system as well as installing take-off and yard connections throughout the plant.

The U. G. I. Contracting Company is making alterations to the sub-station of the Connecticut Light & Power Company at Plainville.

Mitsubishi Shoji Kaisha, Ltd., have just placed an order for two sets of 11 foot U. G. I. cone top carburetted water gas apparatus to be installed at the plant of the Osaka Gas Company in Japan. This apparatus will be complete in all its parts, including automatic controls, Chrisman cycles, waste heat boilers, blowing plant and barring down machine.

The Osaka Gas Company has also ordered two Model "B" automatic controls.

The Penna. Power & Light Company recently called upon the U. G. I. Contracting Company to perform an interesting task at the Lehighton plant of the New Parryville Consolidated Gas Company. Due to the ravages of time and hard work, it became necessary to install a new generator on the one carburetted water gas set at the plant. This had to be done without putting the plant out of commission or inconveniencing the consumers. The Contracting Company readily assumed this responsibility and in record time erected and lined a new generator on skids adjacent to the old generator, even putting the fire therein ready for operation. When the gas company finished its day's work with the holders full, the Contracting Company quickly disconnected the old shell, removed it from the building and slid the new generator into place. There was no delay and the next shift went to work as though nothing had happened.

Gas House Heating Sales Course

The Bryant Heater & Manufacturing Company will sponsor a gas house heating sales course for gas employees at their Cleveland offices from February 21 to March 1, inclusive.

This course will include such items as lectures by men qualified to handle their particular subjects, discussion and solution of heating problems, quizzes and a final written examination.

The lectures and other instruction will treat of all phases of gas house heating and sales methods as well. There will be both morning and afternoon sessions and those taking the course will be furnished meals and lodging by the Bryant Heater & Manufacturing Company.

The tuition fee will be $25 per person attending the course. Full information will be furnished upon request to the Bryant Heater and Manufacturing Company, 17825 St. Clair Avenue, Cleveland, O.

Milton Leaves Western United Gas and Electric Company

Marshall M. Milton, general superintendent of gas, Western United Gas and Electric Company, Aurora, Ill., is now connected with Dri-Steam Valve Sales Corporation, 565 Fifth Avenue, New York. Mr. Milton will serve in the capacity of sales engineer in his new line of work.

To Supply Engineering and Consultation Service

A new engineering and consultation service for municipalities owining their own electric, gas and water systems will be afforded through the organization of the Municipal Utilities Company, 526 Liberty Building, Des Moines, Iowa, of which H. W. Byers is president and general counsel. H. L. Cory is vice-president and general manager, and E. S. Cory secretary-treasurer. The firm will make surveys and submit plans for improvements of old utilities plants with a financial organization which will plan payment upon the project through receipts from the extended service and relieve the municipalities of bond issue for this purpose will be principal work of the new service.

Stacey Bros. to Move New York Office

On and after March 3d the New York office of the Stacey Bros. Gas Construction Co., Cincinnati, O., will be located at 75 West Street, Evening Post Building. Their New York office is now located at 350 Madison Avenue, and Mr. P. F. McEnaney, Eastern sales manager, states that the move to the downtown section is to better facilitate their service to the public utilities interests.

Correction

On page 73, January issue, it was erroneously stated that the Galena (Ill.) Gas Company was sold to the Central Public Service Corporation of Chicago. By way of correction, the Galena Gas Company was purchased by the Federal Public Service Corporation of Chicago.

Trade Catalogs

The Western Gas Construction Company, Fort Wayne, Ind., has recently issued a well illustrated booklet which describes the A-B-C Self Clinkering Generator Base and the Howard Automatic Charger. Data and figures setting forth actual operating results are given. A copy will be sent upon request to the Western Gas Construction Company, Fort Wayne, Ind.

Flexitallic Gasket Company, Camden, N. J., describes in a recent folder Flexitallic gaskets for pipe flanges, tube caps and manholes. A copy will be sent upon request.

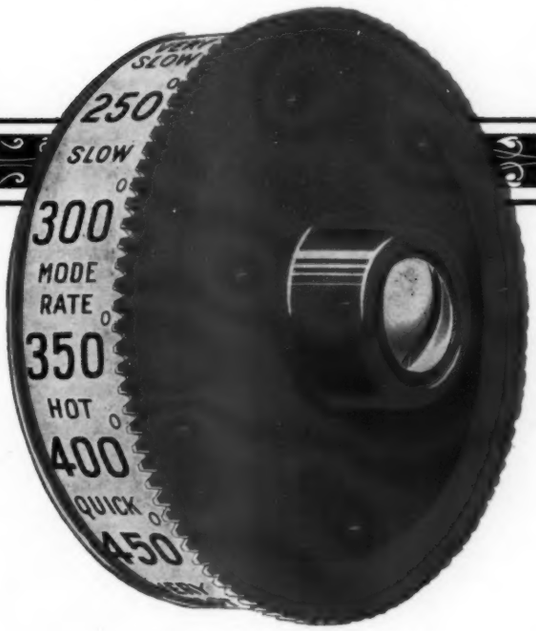
The new Catalog No. 28, issued by Torchweld Equipment Company, Chicago, Ill., devotes some 36 pages to a description of their gas welding and cutting equipment. The data and illustrations are well handled and complete. Torchweld Equipment Company will send a copy of this catalog upon request.

Bulletin No. 362, issued by the Bristol Company, Waterbury, Conn., contains considerable valuable information for the specifying of Bristol's Recording Instruments for the power plant. Typical charts are shown, and in addition there are some interesting pictures of installations of Bristol equipment in various plants. A list of applications is worth-while.

Catalog KSG-2 describes the K. S. G. Process for the Low Temperature Carbonization of Coal. This catalog is attractively made up and contains data and information of interest to gas men. A copy will be sent upon request to International Coal Carbonization Company 200 Madison Avenue, New York City.

"How the Other Fellow Does It" is the title of a small booklet recently published by the Brown Istrument Company, Philadelphia, Pa. This booklet shows the wide variety of Brown Pyrometers Installations in the metal working industries with reference to variety of heat treating processes, variety of products heat treated and variety of furnaces—gas, oil and electric.

Dri-Steam Valve Sales Corporation's new catalog describes their Dry-Steam Valve. Data and information of interest are contained in this publication. A copy will be sent upon request to the above company at 565 Fifth Avenue, New York City.



"Just as the twig is bent the tree's inclined."—POPE

In 2422 Institutions of Learning tens of thousands of young women, Mothers of the Future . . . the great Market of Tomorrow, are being taught the Art of Good Cooking by the aid of Red Wheel Gas Ranges.

AMERICAN STOVE COMPANY, *801 Chouteau Avenue*, St. Louis, Mo.

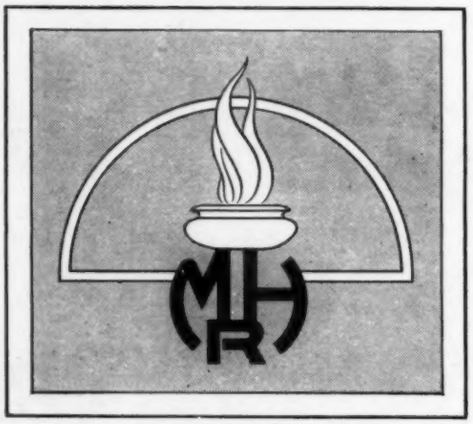
LARGEST MAKERS OF GAS RANGES IN THE WORLD

These are the Six Famous Brands of Red Wheel Gas Ranges:

DANGLER · CLARK JEWEL · QUICK MEAL · DIRECT ACTION · NEW PROCESS · RELIABLE

LORAIN

THIS STRONG ORGANIZATION - IS PREPARED -



— for still greater gas heating development

Working separately, the two components of the recently formed Minneapolis-Honeywell organization performed a service of vital importance to the gas industry. When gas heating was on the threshold of its spectacular career, these established makers of heat regulators were ready with adequate engineering and experimental facilities to develop satisfactory automatic controls.

By the very nature of its operation, the gas-fired house heating plant depends upon these controls for success. The combination of these facilities in the new organization—with no further duplication of effort, and the single purpose of engineering advancement in heat control — therefore is an event of universal interest to gas company executives. It assures the industry that automatic controls will keep pace with gas heating progress, and that all future improvements will be available on a basis of maximum quantity production.

Automatic Controls for House Heating

MINNEAPOLIS
REGULATOR COMPANY
HONEYWELL

EXECUTIVE OFFICES: MINNEAPOLIS
FACTORIES: MINNEAPOLIS AND WABASH, IND.

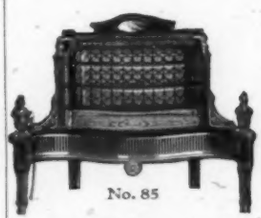
Something Entirely New

No. 112

No. 65

No. 60

No. 102


No. 85

No. 45

No. 30

No. 25

No. 115A

No. 80

Humphrey Models in an Assortment of

Colored Enamels

Our dealers can now meet the strong demand for color in the home.

Ready

MODELS 20 and 31 in
RICH MAROON
BEAUTIFUL GREEN
WALNUT BROWN

and
Without Added Cost
Models 25—30—35
can be shipped at once in Most Attractive Electro-Plated Flemish Brass Finish.

This is the age of color! Everything in the home must be beautiful as well as useful! The variety and beauty of these models are but two of the sales advantages of the Humphrey Radiantfire. Remember also that the genuine Radiantfire, providing clean, healthful heat in well over a million homes, is universally accepted as the finest modern Fireplace equipment.

The HUMPHREY

No smoke—No odor
No ashes—No dust

Radiantfire
TRADE MARK REG. U.S. PAT. OFF.

If it isn't a Humphrey it isn't a Radiantfire.

GENERAL GAS LIGHT COMPANY, KALAMAZOO, MICH.
New York · 44 West Broadway San Francisco · 135 Bluxome Street

Physical Properties of Paint

The two important components of paint are the vehicle and the pigment, for upon them depend the life and wearing quality of the paint.

The Vehicle

Of all paint vehicles linseed oil is recognized as the best and most suitable to withstand wear and exposure.

Even if used alone, linseed oil provides a certain amount of protection as it adheres strongly to the surfaces on which it is applied. But this film soon wears away under the elements and abrasive action of dust, etc.

To increase its wearing capacity this film is made stronger by the addition of some solid substance known as the pigment.

The Pigment

Where the preservation of metal surfaces is the main object, first consideration should be given to a pigment that aids in preserving the original elasticity or "life" of the oil.

The pigment *must* be inert—that is, it shall not undergo any chemical change in use because such a change must cause the film to become pervious and lose its protective power.

The thickness of paint films is limited. Beyond a certain thickness the paint runs, or in drying forms a tough skin on the outer side, leaving the inner portion soft. By preventing the access of air to the under parts this outer skin retards and even prevents thorough drying.

Flake Graphite as a Pigment

Flake graphite has proved, by far, to be the best pigment, for metal protective paint. It is the only one of the carbon family that has the marked endurance necessary for a protective paint pigment.

It is absolutely inert and is not affected by the action of acids, alkalies or other deteriorating agents. It has the peculiar quality of "water repellancy" and as corrosion does not occur except in the presence of water or dampness, this is a strong point for its use as a pigment.

Silica is used to give the natural flake graphite still further endurance. Experience has shown that a mechanical mixture of silica and graphite is in no way equal to the natural combination as found in Dixon's Silica-Graphite Paints.

Dixon's Silica-Graphite Paints are composed of boiled linseed oil for the vehicle and natural flake graphite for the pigment with the addition of small amounts of colors for tinting. They meet the above specifications in every respect.

Write for Color Card and Booklet No. 231-B.

JOSEPH DIXON CRUCIBLE COMPANY

JERSEY CITY D X N TRADE MARK **NEW JERSEY**

ESTABLISHED 1827

DIXON'S SILICA GRAPHITE PAINT

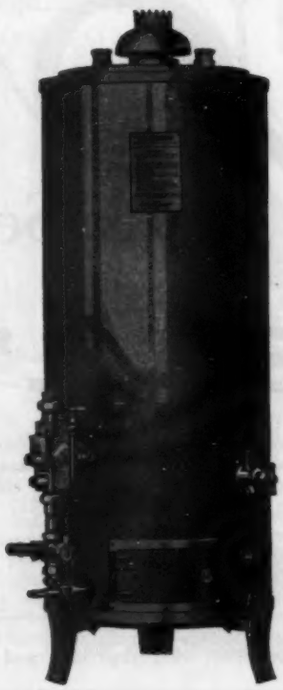
ADEQUATE PROTECTION AT MINIMUM ULTIMATE COST

The Sales Leader for 1928

developed and perfected to assist you to secure a large volume of "satisfied" users of gas heated, always-ready, "turn a faucet" hot water service, is the

KALAMAZOO
Automatic Storage Heater

It really does excel in – –



Handsome Appearance
Low Operating Cost
Absolute Safety

Gives pleasing service as well as low operating costs. No waiting for hot water to cause complaint.

EVERY ADVANTAGE IN LOAD DISTRIBUTION and in meter and gas service costs, is provided.

HUMPHREY BUILT!

THREE SIZES — LOW LIST PRICES
BIG DISCOUNT —
A. G. A. APPROVED

Has –

Humphrey Snap Thermostat
Humphrey Safety Pilot
Pressure Relief Valve
Drain Cock
Copper Cold Water Intake
Brass Connections
Highly Tested Boiler
Rock Wool Insulation

There are other types and sizes to fit any special or unusual need.

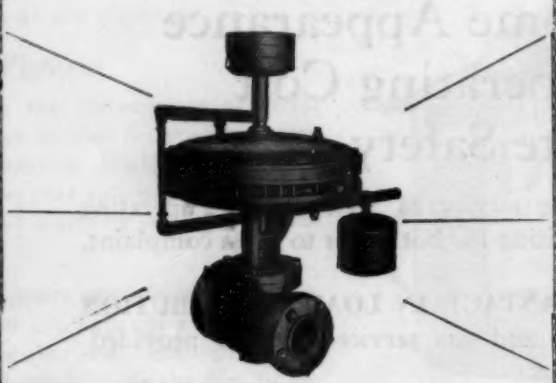
HUMPHREY COMPANY

KALAMAZOO (DIV. OF RUUD MFG. CO.) MICHIGAN

Unusually Sensitive Control for High Pressure Gas Transmission

The Fulton Duplex Sensitive Gas Governor is designed to meet the needs of manufactured or natural gas companies who desire to control a high and varying inlet pressure and reduce it to a low and unvarying outlet pressure for illuminating or fuel purposes.

The power to operate this governor is derived from two dia-

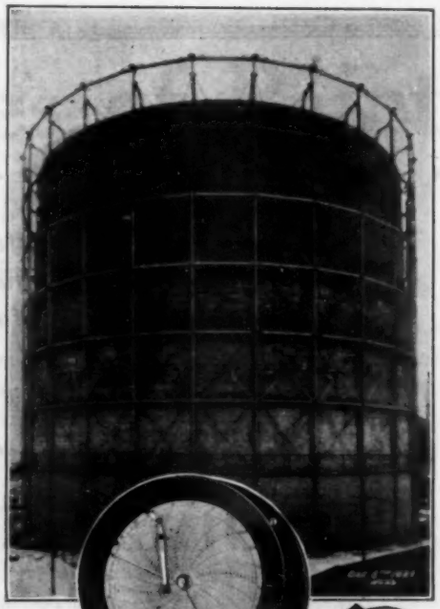


phragms of equal area, moving in opposite directions, but transmitting their power in the same direction. This gives a vast increase in sensitiveness and power over that possessed by a governor with a single diaphragm.

The governor is easily and quickly installed, and, due to the simplicity of its construction, requires but little attention afterward.

Catalogue on request

Chaplin-Fulton Mfg. Co.
28-40 Penn Ave., Pittsburgh, Pa.



Guard Against Freezing of Water-Seals *with* BRISTOL'S

In multiple-lift water-seal gas holders, the temperature of the seal water should be checked carefully during winter months to avoid freezing, and the resultant hindrance to holder operation.

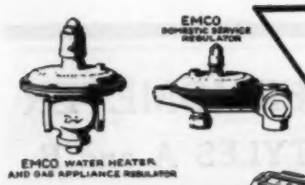
Installation of a Bristol's Recording Thermometer, having sensitive bulb inserted in the recirculating line; with flexible lead extending to the recording unit mounted in the holder station, will show the exact trend of seal temperatures at all times, and enable those in charge of the boilers to maintain conditions within set limits, safe from dangerous high and low extremes.

The Bristol's Thermometer is of simple, rugged construction; incorporating features which make it especially adaptable for Gas plant use.

Write for complete information

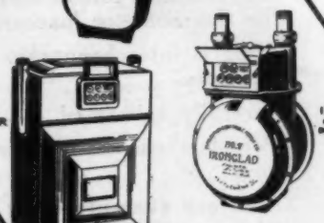
The Bristol Company Waterbury, Connecticut

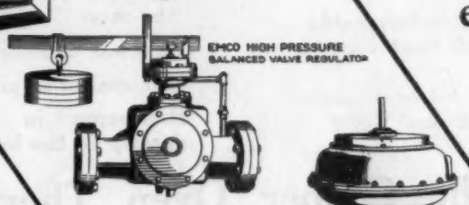
FOR 38 YEARS MAKERS OF BRISTOL'S RECORDING INSTRUMENTS

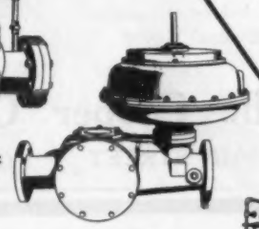


Design Principles

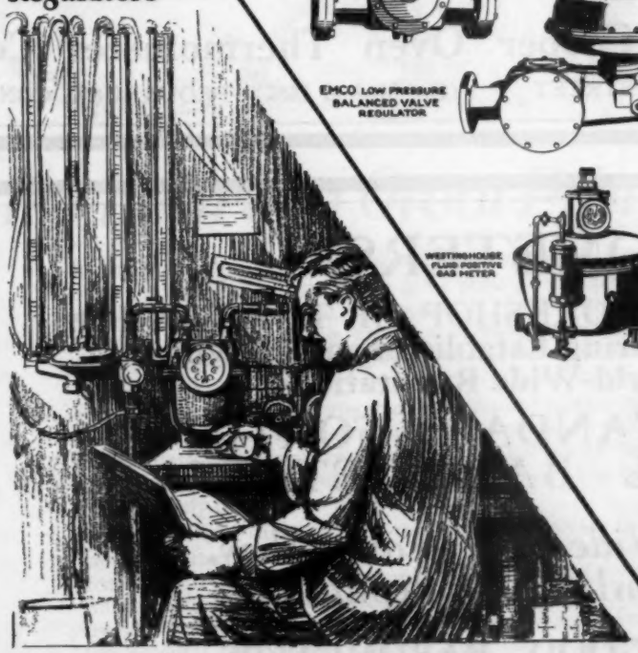
A careful study by our Engineering Department of proper principles for accurate measurement in meters and perfect control in regulators, together with 30 years' experience in building equipment for the Gas Industry assures to our customers absolute satisfaction.

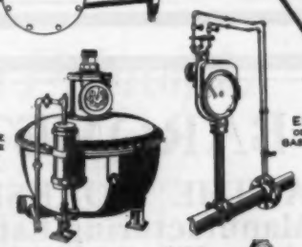


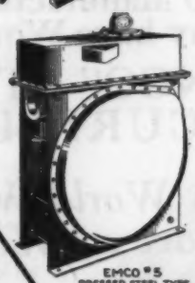




Testing Domestic Service Regulators







PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS
TULSA SEATTLE KANSAS CITY SALT LAKE CITY

COOPER OVEN THERMOMETER

FEATURES OF NEW STYLES A and B

STYLE B

(*Actual Size*)

Interchangeable with heat control.

Nickel or Porcelain Enamel Cover

- Shows actual Fahrenheit degrees.
- Quick-acting thermostatic metal registers correct temperature immediately.
- Extreme heat cannot injure or make the thermometer inaccurate.
- Style B interchangeable with heat controls.
- Carefully calibrated.
- Porcelain enamel dials in two colors.
- Accuracy guaranteed for the life of the oven.
- No glass or mica to get broken.
- Economical in price.
- Handsome in appearance, adds greatly to the looks of any oven.

The Cooper Oven Thermometer Co.

4 MAIN STREET (Established 1885) PEQUABUCK, CONN.

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD, has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

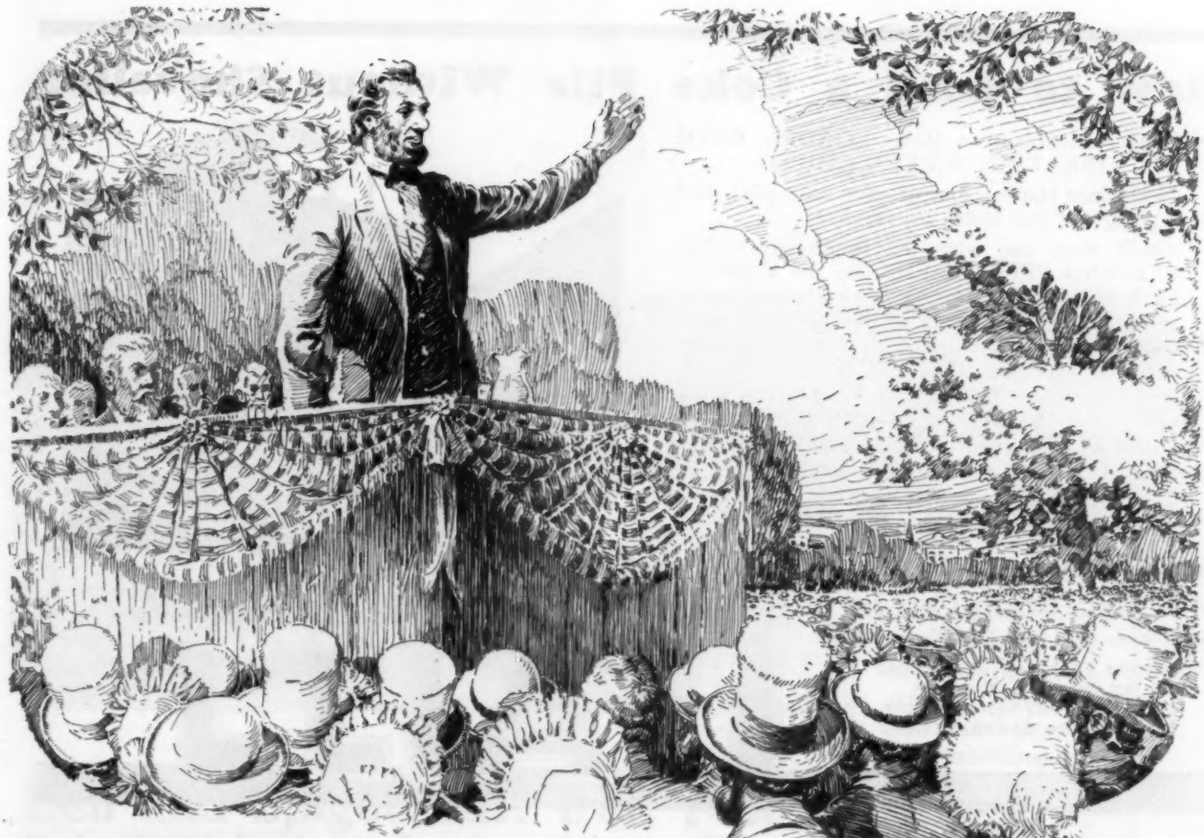
"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - - PHILADELPHIA, PA.



The Birth of a Great Principle

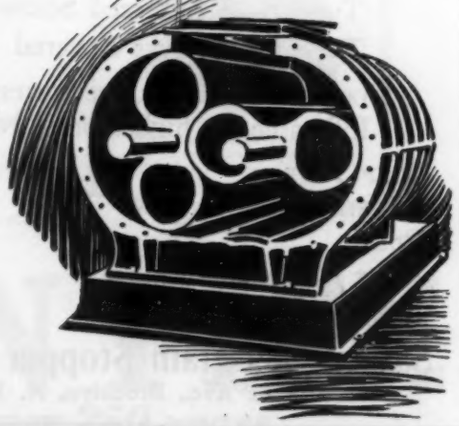
In the days before '60, when political and economic differences divided the country; when great principles of government were being vigorously pronounced, and just as firmly opposed; in those days, in a little shop in Southern Indiana, a principle—unimportant to the public at large, but of great consequence to certain industries—was successfully demonstrated.

For 69 years, the Roots principle has remained substantially unchanged. It has demonstrated its efficiency in thousands of installations all over the world, and has proven its versatility in serving successfully, almost every kind of industry under widely different conditions.

There is no hint of a "let-well-enough-alone" policy in the fact that, after all these years, Roots equipment is still made according to the principle evolved in 1859. Rather, its continued application to the exacting demands of modern industry is a tribute to the ingenuity of its inventors and a proof of its fundamental correctness—for time is the test of greatness.

In foundries, process industries, mines, metal working plants, public utilities, and many other industries, Roots equipment is proving the greatness of the two impeller, positive displacement principle.

There's an application in *your* plant that can be served by a Roots unit. If you wish to consult with our engineers, their time is yours.



The P. H. & F. M. ROOTS CO.

CONNERSVILLE, INDIANA

CHICAGO
Peoples Gas Building

NEW YORK
120 Liberty Street

How to Load a Coke Pile Without Shoveling

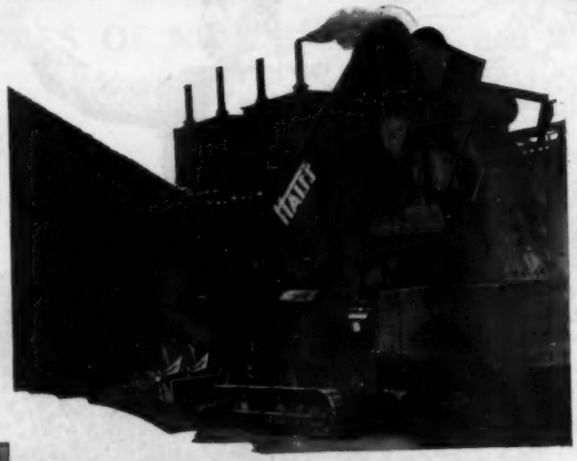
First: Investigate a Haiss LOADER WITH ITS VIBRATING SCREEN CHUTE.

Next place one in front of your coke pile; start it going and just *watch the results!*

You'll then see why we emphasize SELF-FEEDING PROPELLERS and the VIBRATING SCREEN CHUTE—bucket after bucket (and they're continuous) will go up to the chute heaping full of coke. And then, as each bucket drops its load, the VIBRATING CHUTE will take out all the dust and let NOTHING BUT CLEAN COKE land in the waiting truck.

HOW DOES 80 FIVE-TON TRUCK LOADINGS PER 8-HOUR DAY SOUND TO YOU?

Ask for Catalog 527 and mention your interest in SCREENING.



George HAISS Manufacturing Co., Inc.
Park Ave. & 141st St., New York.

TRUCK LOADERS—ELEVATORS
CLAMSHELL BUCKETS
BELT CONVEYORS—SCREENS
HOPPER GATES, ETC.

HAISS

GOODMAN
Used since 1897
Improved Locking Sleeve
GAS MAIN STOPPER

STREET DEPARTMENT SUPPLIES

DEPENDABLE GAS MAIN BAGS
Type A—Seamless
Type B—Reinforced Seams
Type C—Canvas Covered

GOODMAN CYLINDRICAL STOPPER
Inflatable for higher pressures

SOAP TAPE
BRUSHES
PLUGS
JOINT RUNNERS
AIRLINE MASKS

Safety Gas Main Stopper Co.
523 Atlantic Ave., Brooklyn, N. Y.

COX'S COMPUTERS

Save Time and Worry

FOR HIGH PRESSURES
$5.00 Net

FOR LOW PRESSURES
$3.50 Net

Orders Filled Immediately

AMERICAN GAS JOURNAL
53 PARK PLACE - NEW YORK

© by Henry Fuermann & Sons, Chicago

Bell and Spigot Cast Iron Pipe
is built right into the fountain itself —

The Buckingham Fountain in Grant Park, Chicago, was built as an everlasting memorial. The Cast Iron Pipe once installed had to last indefinitely.

WHEN turned on full the fountain has a pump capacity enough to supply a city of over 150,000 people. The basins hold three and a half million gallons of water. The piping is of Cast Iron with diameters from 4" to 20".

Cast Iron Pipe was selected for its low maintenance cost and permanence.

Over 250 years ago another famous fountain was built with Cast Iron Pipe supply lines, the fountain in the garden of Versailles in France.

Once installed Cast Iron Pipe can be forgotten—a matter of vital interest to every taxpayer, construction engineer and municipal official.

THE CAST IRON PIPE RESEARCH ASSOCIATION
People's Gas Building, Chicago, Ill.

This Association was founded for the purpose of giving information and help—*it has nothing to sell.*

Its primary interest is the collection and distribution of all information relative to Cast Iron Pipe for all purposes—and in arousing public interest in waterworks construction.

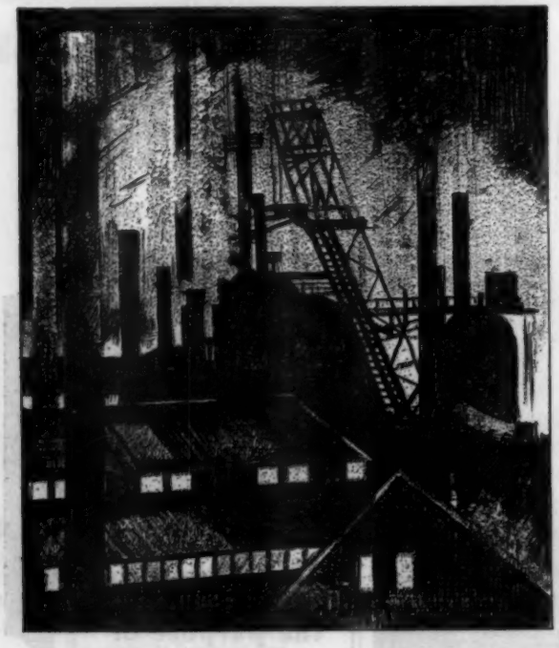
Consulting engineers, contractors and municipal officials are invited to write.

Of especial importance is an article on the "two mains system." Write to the Research Engineer for a copy of this or other literature on the subject of water systems which may be interesting to you.

BELL *and* SPIGOT JOINT—*the accepted standard for underground construction.*

CAST IRON PIPE

—in continuous service for over 250 years



WHEN economical output depends upon scientific production, use reliable, dependable *Tycos* Temperature Instruments to indicate record and control your heat units.

Write for catalogs, specifying the nature of your plant.

Taylor Instrument Companies

Rochester, N. Y., U. S. A.

Canadian Plant: Tycos Building, Toronto

Manufacturing Distributors in Great Britain: Short & Mason, Ltd., London

Tycos
Temperature Instruments
Indicating Recording Controlling

Byllesby Engineering and Management Corporation

BYLLESBY
PIONEERS IN PUBLIC SERVICE
ENGINEERING FINANCE MANAGEMENT

CHICAGO NEW YORK

Pittsburgh San Francisco

GAS OUTLETS
Made of LAVA

There are many forms of Lava outlets available for use with manufactured or natural gas.

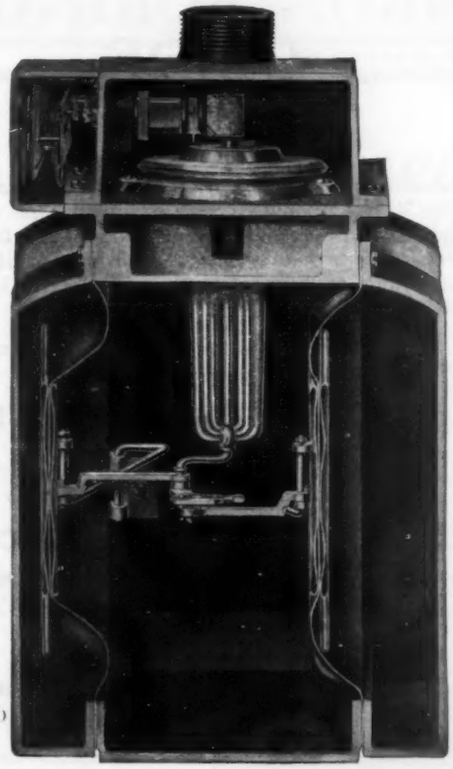
Parts which we have made have, through wide commercial use, proven the superiority of Lava over other materials as a seat for gas combustion.

WE INVITE CORRESPONDENCE

American Lava Corporation

29-59 William St. Chattanooga, Tenn.

Manufacturers of Lava Tips & Heat Resistant Insulators



Sprague Standard Meters

for
accurate
pilot light
measurement

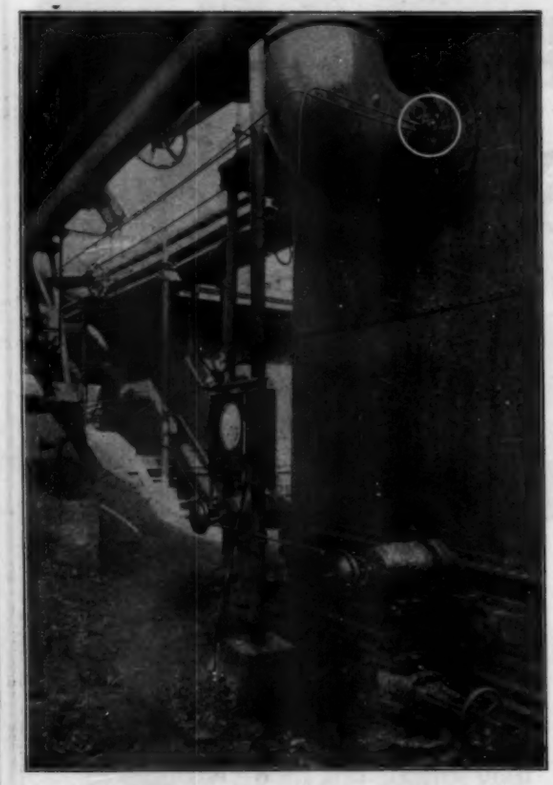
Sprague Standard Meters represent over twenty years of progress

Write for Bulletin No. 10

Sprague Meter Company

Bridgeport **Conn.**

CONTROL OF TEMPERATURES



In the Efficient Gas Plant, the controlling and recording of critical temperatures has proved an economy. Records of temperatures and pressures are records of plant operation. And such records of operation are guides to efficiency.

The gas from the condenser should be at the correct temperature entering the scrubbers. At this large New York Gas Plant the proper temperature is maintained automatically by an American Temperature Controller, which regulates the amount of water fed to the condenser. American Recording Thermometer produces a written record of the temperature, thus serving as a check on the controller.

Write for the following Catalogs:

Gas Maker's Gauge Catalog P-7
Recording Gauge Catalog E-7
Thermometer Catalog F-7
Recording Thermometer Catalog H-7
Tachometer Catalog J-7
Temperature Controller Catalog R-7

AMERICAN INSTRUMENTS

American Schaeffer & Budenberg Corporation

338 BERRY ST. BROOKLYN, N. Y.
Branches in Principal Cities
Makers of American Industrial Instruments Since 1851

Improved

IRON BORING OXIDE

Gas Purification at Lowest Cost

Our Improved Iron Boring Oxide will *remove* the largest amount of H_2S *at lowest cost.* It has earned an enviable reputation for its *low resistance to flow of gas,* and uniform purifying value at different stages of its active life as well.

The outstanding features of Improved Iron Boring Oxide are

ACTIVITY—ENDURANCE
REVIVABILITY

Let Us Help Solve Your Purifying Problems

GAS PURIFYING MATERIALS CO.

Foot of Halsey Street Long Island City, N. Y.

Branch Yard to Serve New England
Providence, Rhode Island

RITER-CONLEY CO.

STEEL CONSTRUCTION
PITTSBURGH

STEEL PLATEWORK
FOR
THE GAS INDUSTRY

Gas Holders
Pressure Tanks
Steel Pipe
Steel Barges
Oil Tanks
Purifiers

BRANCH OFFICES

New York — Boston — Baltimore
Chicago — Philadelphia — Detroit
Cleveland — Cincinnati — Seattle
San Francisco — Los Angeles

THE BABY DIGGER

REGISTERED

Unequalled—
for Gas Distribution Work

Built-in features like the following have effected new and greater economies for many Gas Companies who now use Baby Diggers on their trenching:

Compactness—The Baby Digger's overall width of only 4 feet 10 inches and its quick-shifting dirt conveyor have made machine-trenching profitable, where before only hand-labor was possible.

Light Weight—An important advantage when working over sidewalks or soft ground. The Baby Digger weighs only 4 tons and is therefore quickly transported from job to job on trucks or the special trailer furnished by this company. Experience has been that one machine serves several pipe-gangs by this method.

Design—Simple, rugged and practical. Close-knit frame mounted on full crawlers—wheel-type digging action for strength, reliability and speed—gear-shift speed changes—fine alloy steels, etc.

Send for the bulletin, "Make Machine Jobs of Hand-labor Jobs" and get the whole story.

The Cleveland Trencher Co.

(Pioneers of the Small Trencher)

20100 St. Clair Ave. **Cleveland, Ohio**

The COMPLETE Domestic Laundry Unit

Keep the Washing at HOME—

EVERY washing done away from home represents a *definite, calculable loss to your own gas company.* It means a positive gas-load decrease. It represents a loss from water-heater, dryer and ironer. It means a load-loss to power companies from washer and ironer. And this loss, over a period of weeks or months, is surprisingly large.

The LAMNECK LAUNDRY DRYER

offers a definite solution—to this very definite problem of yours. *It assures the washing being done at home—at all times.* It dries the clothes clean, white and sweet-smelling in remarkably short time. It is the connecting link in the labor-saving chain of domestic laundry equipment—washer, dryer, ironer. It has an enclosed gas burner, thermostatic temperature control, a safety pilot light and drying space equal to sixty feet of clothesline.

Lamneck is paving the way. Consumer acceptance is a reality. And with the intensive national advertising campaign recently launched, backed with forceful selling literature, window trims, store cards, mats, etc., *consumer demand is a certainty.*

Get in on this Lamneck proposition—*and keep the washing at home!* Talk dryers, display dryers—*and you'll sell dryers!* Wire—or mail the coupon below—today!

THE W. E. LAMNECK COMPANY
COLUMBUS, OHIO

THE W. E. LAMNECK CO.,
Dept. P, Columbus, Ohio.

Gentlemen: We're ready to go. Ship ..... dryers to us at once, with literature, mats, etc.

Name .....

Name of Company .....

Address .....

FLANGE END VALVES

We can furnish Valves for working pressures up to 1200 lbs. per sq. in.

Send for Circular 5

The LUDLOW

VALVE MANUFACTURING COMPANY
TROY, N. Y.

New York 62 Gold Street	Boston Tremont Bldg.	Philadelphia Harrison Building
Chicago The Rookery	Pittsburgh Oliver Bldg	Kansas City R. A. Long Bldg.

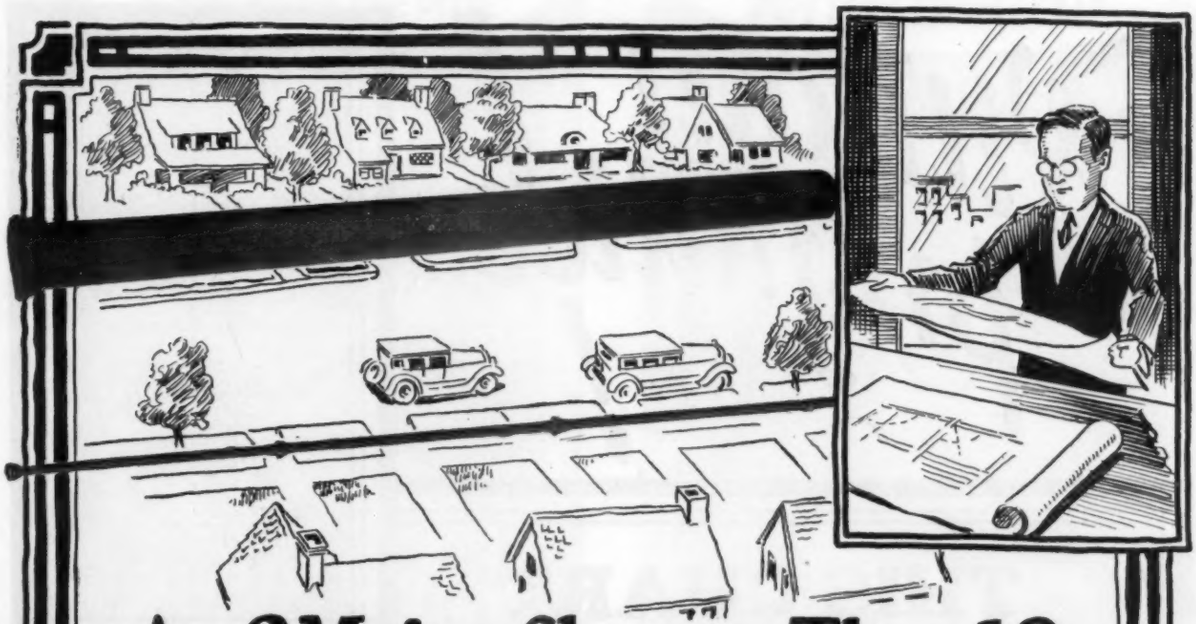
LEADING GAS COMPANIES USE LAMBERT METERS

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.



Are 2 Mains Cheaper Than 1?

IT IS hard to believe sometimes, but it seems a new idea always must struggle along for awhile

Remember, the duplex-main is intended only for residential streets Down one side of the street lay a McWane pipe line—say 6-inch or 8-inch. On the other side of the street lay a 2-inch McWane pipe. Water works authorities favor a 2-inch secondary main because experience has shown difficulty in obtaining proper circulation through secondary mains of larger size

Cross connect the two mains at each street intersection—use the larger main for fire plugs

The elimination of service lines to a single main in the street, saves more than the cost of the small main of the duplex-system! Installation and maintenance of service lines is simplified—and much less expensive. Cutting and repairing street paving is over

The Duplex-Main, though rather revolutionary, is winning converts—men who keep up with the times by looking for new ideas It sounds funny at first, but it STANDS INVESTIGATION Write us for details, diagrams and prices We are the largest manufacturers of Two-Inch cast iron pipe in the world.

WRITE FOR ILLUSTRATED LITERATURE

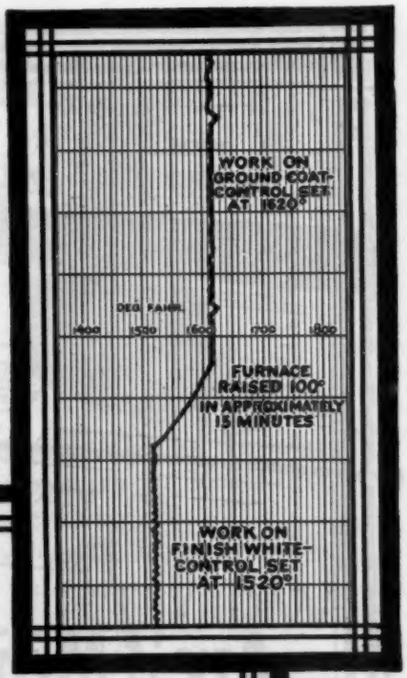
McWANE CAST IRON PIPE CO.
BIRMINGHAM, ALA.

PACIFIC STATES CAST IRON PIPE CO.
PROVO, UTAH

SALES OFFICES IN PRINCIPAL CITIES

McWANE
CAST IRON PIPE

Without prejudice!



THIS CHART SHOWS

how gas was regulated for two different jobs.

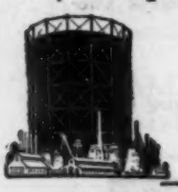
The first job required a temperature of 1520 degrees Fh.

The next job demanded a heat of 1620 degrees Fh.

It took only fifteen minutes to increase the heat 100 degrees.

There is nothing sympathetic or sentimental about an automatic recording instrument. It just registers the facts, and lets them speak for themselves.

The facts revealed by this chart show that Gas Heat gives Control, Speed, Increased Production, Uniform Production, and No Spoilage; all elements that make for economy in operation, and consequently increase in profit.



You would like information concerning the use of gas as a fuel in your own factory, and can easily obtain it by writing to your own gas company, or to

American Gas Association
420 Lexington Avenue, New York City

YOU CAN DO IT BETTER WITH GAS

The Industrial Section of the A. G. A. is broadcasting the above advertisement in a number of engineering and industrial papers for the benefit of the gas industry at large

A Short Cut to Pipe Satisfaction!

Every gas company engineer and executive will recognize the need for pipe that will give continued good service and last for years and years without replacement. They want pipe that will minimize the losses from corrosion, particularly pitting, and give a full, strong flow at all times. The workman who installs it wants pipe that runs uniform in every length—pipe that will cut and thread easily—that is clean and smooth and free from blisters and scale, both inside and out. He wants pipe that will give complete satisfaction to the engineer and be a credit to himself as the workman on the job.

This is a big job for any pipe, but is exactly what "NATIONAL" Scale Free Spellerized Pipe is made to do. The Scale Free Process is applied to all butt-weld sizes ½ to 3-inch and the Spellerizing Process to all welded sizes 4-inch and under. Both processes are patented and applied exclusively to "NATIONAL" Pipe—representing a short cut to pipe satisfaction. The advantages of this special pipe are described in Bulletin No. 7. Send for your copy.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
DISTRICT SALES OFFICES IN THE LARGER CITIES

Use Scale Free Pipe

Patented
Beware of Unsafe Infringing Imitations

AKME CONSUMING FLUE

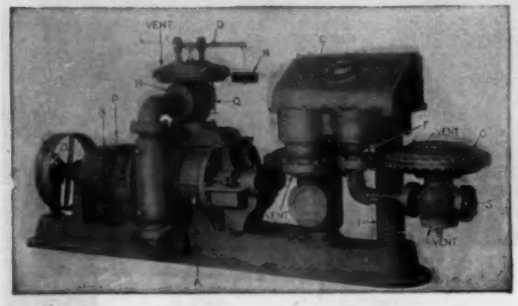
Highly recommended by Gas—Chemical—and Combustion Engineers for Gas Ranges, because it is the only safe and efficient flue to use.
Range Experts consider it a necessity for the more economical—safer—and better operation of gas ranges.
Keeps the Kitchen free of grease and the dirt it collects—Assures the proper oven draft being constant.
Prevents serious hazards caused by connecting Ranges to the outside or oven vents being open.

FLues in: Silver Finish, Black Japan, Whitegray Enamel

WORTH MANY TIMES THEIR COST

AKME FLUE, INC.
1517-27 Guilford Ave.,
Baltimore, Md.

THE IMPROVED KEMP SYSTEM



Opens up Bigger Opportunities for the use of Gas

For many years we have specialized in methods for greater efficiency in the utilization of gas for industrial heating operations.
Through energetic research we have found opportunities for the use of gas, undiscovered by the average gas man. To meet the requirements of our findings, we have developed the improved Kemp Automatic Gas System, whereby improvements and economies can be realized that will be productive of a larger use of gas and prove satisfactory to both user and gas company alike.

Send for new descriptive catalog, or, better still, request one of our engineers to call—it will not obligate you.

THE C. M. KEMP MFG. CO.
405-415 East Oliver Street Baltimore, Md.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P Co.

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

Specialists in Fire Clay Refractories
With Over 30 Years Experience

Fire Brick for oil fuel furnaces, boilers and metallurgical furnaces.
Tiles and blocks of special shape for all purposes.
Muffles and planches, Coal gas benches.
Brass furnace linings, Water gas linings, Cupola linings.
Clay and Silica Retorts and settings.
Ground fire clay, Ground fire brick, Plastic fire brick, Refractory Cements.

THE JERSEY CITY REFRACTORIES CO.

135 WEST SIDE AVENUE *A. E. ACHESON* JERSEY CITY, N. J.

Cement-lined MONO-CAST CENTRIFUGAL pipe- *-to prevent tuberculation!*

Cement lining to resist interior tuberculation.....cast iron outer shell to resist pressure and shock due to water hammer and vibrations.....that's the efficiency-raising combination developed in Acipco Mono-cast centrifugal cast-iron pipe.

Cast iron and cement are old "stand-bys" in water-works construction. Reservoirs, basins, and flumes have long been built of concrete, and pipe of cast iron. Combined in one pipe—as in Cement-lined Mono-cast—these two time-tested materials raise efficiency and volume in any water works system where the tuberculating effect of the water is very pronounced.

Cement-lined Mono-cast pipe is furnished in any of the regular Mono-cast sizes: 4-inch, 6-inch, 8-inch, 10-inch and 12-inch, in the bell and spigot type with a bead cast on the spigot end. Mono-cast pipe is made in *sixteen-foot lengths,* eliminating one-fourth of the joints in the line, and twenty-five per cent of laying costs!

AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM, ALABAMA
DISTRICT OFFICES IN PRINCIPAL CITIES

Lux Material Never varies. It has been of a uniform high quality for more than 25 years.

THE ALPHA-LUX COMPANY, Inc.
192 FRONT ST., NEW YORK CITY
Shipping points convenient to all parts of the country

For long time contact, low temperature or any severe purifying service. **Lux-Sponge** THE PERFECT READY MIXED OXIDE

GROBLE REGULATORS & GOVERNORS
for Artificial or Natural Gas.

Regulators	Governors
High Pressure Service	District Station
Intermediate Pressure Service	Holder
Low Pressure Service	
High Pressure Line	Intermediate Pressure

Relief Valves Back Pressure Valves
Automatic Quick Closing Anti-Vacuum Valves
We Solicit Your Inquiries
GROBLE GAS REGULATOR COMPANY
Anderson, Indiana

FIRE-CLAY SHAPES
Made to SPECIAL DESIGN
A variety of clay mixtures are used in the Special Shapes and Tile Department. The WALSH plant has a daily producing capacity of more than 155 tons of special shapes and tile, and is, therefore, prepared to serve the needs of the gas industry effectively.
Let us figure on your "Specials"
WALSH FIRE-CLAY PRODUCTS CO.
NEW YORK ST. LOUIS CHICAGO

Keeping Pressures "down to earth"

Pressures are automatically, instantly, relieved before they become at all dangerous if the domestic hot water supply system is guarded by a Red Top Relief Valve Model No. 1. Pressures are kept down to earth as a matter of course.
Acting on the gravity principle, the operation of a Red Top is so positive that it has won even for the valve the official approval of the Underwriters' Laboratories, Inc., as well as State and Municipal Boards of Boiler and Water Inspection.
The valve may be set to relieve at 50, 75, 100 and 130 lbs. It should be set at least 25 lbs. higher than city water pressure.

Sectional View of Model No. 1

May we send you further data?

Neptune Meter Company,
50 E. 42nd St., New York City
Branch Offices in Principal Cities

Red Top Relief Valves

Stawite FLOOR SAVERS
UNDER THE FEET OF GAS STOVES, GAS WATER HEATERS and GAS REFRIGERATORS

They protect floor coverings and hardwood floors against the damage caused by the weight concentrated on small iron feet. Made of White Porcelain. —low in price and attractive in appearance.

The Electric Porcelain & Manufacturing Co.
TRENTON, NEW JERSEY
SEND FOR SAMPLES

Russell Engineering Company St. Louis
Coal Carbonization Plants, Benches, Repairs, Improvements, Extensions, Apparatus

KITSON COMPANY

INCORPORATED 1897

G-201—Flat Head Key

G-203—Tee Head Key

THIRTY YEARS EXPERIENCE AND ESTABLISHED REPUTATION

G-205—Square Head Key

G-215—Lock Wing Key

KITSON. COMPANY Westmoreland and Stokley Streets PHILADELPHIA, PA.

Why Is a Gas Appliance?

Probably nowhere else in the world is the use of gas for fuel purposes so general as in Southern California. There are scores of gas appliances manufactured in Los Angeles and sold in the local market.

The Pacific Coast Gas Association wanted to be able to

Pick the Good from the Bad

and found, in its study of the question, that no judgment could be made until a standard laboratory procedure had been developed. This study has resulted in the

Gas Appliance Testing Code

The only manual of laboratory practice in gas appliance testing now in print.

AUTHORITY

Prepared and edited by the Technical Section of the Pacific Coast Gas Association under the supervision of E. L. Hall of the Portland (Oregon) Gas & Coke Company, Chairman of the Section. The special committee which compiled this volume was headed by R. M. Conner, now Director of the Gas Appliance Testing Laboratory of the American Gas Association. Mr. Conner was assisted by Walter M. Berry, formerly Gas Engineer of the Bureau of Standards and now Executive Engineer of the California Gas Research Council, and Prof. S. H. Graf of the Oregon State Agricultural College.

Brief Table of Contents

1. **INTRODUCTION—**
   Object, Theory, Data, Organization, Formulae, etc.
2. **DEFINITIONS—**
   Power, Combustion, Volume, Heat, Losses, etc.
3. **LABORATORY EQUIPMENT—**
   Its Character and Use.
4. **GENERAL CONSIDERATIONS—**
   Adaptability, Life and Efficiency of Gas Appliances.
5. **METHODS FOR TESTING DOMESTIC GAS APPLIANCES—**
   Ranges, Dryers, Ironers, Griddles, Water Heaters, etc.
6. **METHODS FOR TESTING GAS HOUSE HEATING APPLIANCES—**
   Boilers, Furnaces, Radiators, Fireplaces, etc.
7. **METHODS FOR TESTING INDUSTRIAL GAS APPLIANCES—**
   Ovens, Gas Engines, Heat Treating and Metal Furnaces, etc.
8. **METHODS FOR TESTING GAS LIGHTING APPLIANNCES—**
   Arcs, Glassware, Mantles, etc.
9. **METHODS FOR TESTING MISCELLANEOUS GAS APPLIANCES—**
   Blowers, Fans, Tubing, Thermostats, Valves, etc.

APPENDIX—Tables of Orifice Capacity, Gas Flow and Gas Constants.

ILLUSTRATED 5½ x 7½ CLOTH 143 pp. $5.00 POSTPAID

PACIFIC COAST GAS ASSOCIATION

447 SUTTER STREET, SAN FRANCISCO, CALIF.

The Sixth Edition of the American Gas Catalog

Has Met the Unqualified Approval of the American Gas Industry from Coast to Coast

Immediately upon delivery of this annual "Reference Book of the Gas Industry," hundreds of Gas Executives, representing every branch of the industry, wrote acknowledgment of its receipt and expressed their appreciation in no uncertain terms. From the many we cite the few which follow:

FROM A MANAGER:
"Very handy in buying. Refer to same two or three times each week. Saves considerable time in reference work."

FROM A PRESIDENT:
"The Catalog is a fine product and of real value, and, while we are a small company, we will use it frequently. We have used the past editions in ordering and shall with this one."

FROM A PLANT SUPT.:
"We find the Am. Gas Catalog is very satisfactory in ordering supplies for both our plant and distribution departments."
"A fine compilation of reference data."

FROM A SUPERINTENDENT:
"We always have this Catalog handy in our office and same has proven very valuable to me and the employees at the plant."

FROM A DISTRICT MANAGER:
"I find Catalog contains valuable data for which we find frequent use."

FROM A GAS ENGINEER:
"We are very pleased with our edition of the 1927 Am. Gas Catalog. It contains very useful information and lists manufacturers foremost in their particular field."
"It is most complete in every detail and the data and information contained therein will be of very great value to our Plant and Distribution Supts."

It is indeed very gratifying to learn, through the many expressions of opinion received, that our efforts to produce a really helpful reference book for every branch of the industry has merited the approval of Chief Executives, Superintendents, Managers, Engineers and Purchasing Agents. Your personal copy of this Catalog of great reference value throughout the year. Use the coupon and order it now, as the current edition is nearly exhausted.

American Gas Catalog
53 PARK PLACE
NEW YORK

Send Coupon

American Gas Catalog,
53 Park Place,
New York, N. Y.

Please enter.....my order for.....extra copies of American Gas Catalog, 1927 Edition, at $2.50 each.

Company .....
City .....State.....
Name .....
Position .....

COX'S COMPUTER

FOR HIGH-PRESSURE L UID DISCHARGE

Will save hours of tedious, brain-tiring computation and get results instantly when seeking to find the Discharge from a pipe. Also to find suitable initial and Therminal Pressures.

Based on a well-known and reliable formula, which is applicable to Gas, Air and other elastic fluids, flowing through pipes with high initial pressures.

Price $5.00 each, net, in cloth case 6½ x 8 inches

COX'S GAS FLOW COMPUTER

For Low Pressures

This computer solves Prof. Pole's formula for the flow of gas in pipes. All the work is done for the Engineer in making computation relative to the subject covered by the title.

Price $2.50 each, net, in cloth case 6½ x 8 inches.

For Sale by

AMERICAN GAS JOURNAL

53 Park Place New York City.

WESTMORELAND "CRITERION" GAS COAL

The Standard for Gas Making Since 1854

Since this Company commenced operations, its well-known Westmoreland "Criterion" Gas Coal has been largely used by the Gas Companies of Northeastern United States and Canada, and its character is established as having no superior in gas giving qualities and freedom from sulphur and other impurities.

Mines situated on the Pennsylvania Railroad,
in Westmoreland County, Pa.

THE WESTMORELAND COAL COMPANY

Principal Office, Lewis Building, 15th and Locust Sts., Philadelphia, Pa.

Shipping Ports: Philadelphia, Baltimore, South Amboy, N. J., Lake Ports.

LAVINO OXIDE

FOR GAS PURIFICATION

E. J. LAVINO AND COMPANY. BULLITT BLDG. PHILADELPHIA, PA.

CLASSIFIED ADVERTISEMENTS

Rate at $5.00 per inch for first insertion. $4.00 per inch for each additional insertion of same copy. Positions wanted—$2.00 per issue.

POSITION OPEN

GAS SALES ENGINEER—Experienced in house heating. State complete details as to experience, age and salary desired. Address Box 924, care of American Gas Journal, 53 Park Place, New York City.

POSITION OPEN

POSITION OPEN—Wanted First Class Meter Repairer. Good Salary. Apply William Buchan, care of Galveston Gas Company, 2422 Avenue D, Galveston, Texas.

POSITION WANTED

WANTED—Position as Superintendent of Plant and Distribution. Twenty-five years experience. Am a hustler and can get results. Experienced in laying welded pipe. Available at once. Address Box No. 922, care of American Gas Journal, 53 Park Place, N. Y. C.

GEORGE H. WARING
CONSULTING ENGINEER
POWERS THEATRE BUILDING
Grand Rapids Mich.

GAS ENGINEERING CO.
Manufacturers of Gas Production Equipment
TRENTON, N. J.

ATTENTION
Gas Companies and Utilities Anywhere—Everywhere.
We are in a position to furnish material for Welded Gas Mains and also do the Construction Work.
Write for Information
BURNS CONSTRUCTION COMPANY,
Park Ridge, Illinois.

Safety First - $15 Factory
Boy Does The Work of Two Men
Locks Either Upright or for Draining
Pays for Itself by Drainage Saved.
Prevents Personal Damage - Hence Lawsuits
Endorsed by Safety Bureaus and Institutes.

AGENTS WANTED

Safety Carboy Holder and Truck Corporation
78 Franklin St., New York

JOHN S. UNGER
GAS ENGINEER
Specialist in Ammonia Recovery
and Manufacture of Ammonia Products,
Builder of Unger Ammonia Stills
640 GRACE ST., CHICAGO

Cox Computers Save Time and Worry
For low pressures—$3.50 For high pressures—$5.00
ORDERS FILLED IMMEDIATELY
AMERICAN GAS JOURNAL 53 Park Place, N. Y.

1876 PURIFYING MATERIAL, — BAGGED OR BULK 1927
Manufacturers of GOVERNORS, APPARATUS and EQUIPMENT
IRON Connelly Iron Sponge and Governor Co. New York, Chicago U.S.A. SPONGE
USE THE BENEFIT OF 50 YEARS EXPERIENCE!

Buyers' Reference Index

See page 125 for advertisements of these products

ACCUMULATORS—STEAM
Ruth's Steam Accumulator Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp
The Gas Machinery Co.
The U. G. I. Contracting Co.

ACCOUNTING MACHINES

ADDING MACHINES
Remington Rand Business Service, Inc.

AIR-LINE MASK.
The Safety Gas Main Stopper Co.

AMMONIA CONCENTRATORS
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.
The Stacey Manufacturing Co.
John S. Unger.
Western Gas Construction Co.

AMMONIA CONCENTRATED LIQUOR PLANTS
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

AMMONIA PIPE
National Tube Co.

AMMONIA RECOVERY APPARATUS
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Riter-Conley Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
John S. Unger.
Western Gas Construction Co.

APPRAISALS & INVENTORIES
The U. G. I. Contracting Co.

ASBESTOS PACKING
Safety Gas Main Stopper Co.

ASH STORAGE BINS
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BAGS
Connelly Iron Sponge & Gov. Co.
Rubber & Canvas Covered
Safety Gas Main Stopper Co.

BAROMETERS
Taylor Instrument Companies
Precision Ther. & Inst. Co.

BENCHES
The Gas Machinery Co.
The Improved Equipment Co.
Isbell-Porter Co.
The Jersey City Refractories Co., Inc.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

BENCHES
Complete
Semet Solvay Engineering Co.
Walsh Fire-Clay Products Co.
West Gas Improvement Co.

BENZOL
Bartlett-Hayward Co.
Carl Still, Incorporated.
The Koppers Construction Co.
Semet Solvay Engineering Corp.
Western Gas Construction Co.

BILLING MACHINES

BOOKKEEPING MACHINES
Remington Rand Business Service, Inc.

BLOWERS
The Connersville Blower Co.
P. H. & F. M. Roots Co.

BLOWERS & BOOSTERS
Gas Engineering Co.
The Gas Machinery Co.
P. H. & F. M. Roots Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
Western Gas Construction Co.

BLUE GAS PLANT
Bartlett-Hayward Co.
Carl Still, Incorporated.
Gas Engineering Co.
The Gas Machinery Co.
The Improved Equipment Co.
Isbell-Porter Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Combustion Engineering Corp.
The Gas Machinery Co.
Isbell-Porter Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
Western Gas Construction Co.
West Gas Improvement Co.

BOXES, CURB
Mueller Co.

BRICK
Silica
E. J. Lavino & Co.
Walsh Fire-Clay Products Co.

BRICK, FIRE AND CHECKER
The Jersey City Refractories Co., Inc.
Russell Engineering Co.
Semet Solvay Engineering Corp
The U. G. I. Contracting Co.
Walsh Fire-Clay Products Co.
Western Gas Construction Co.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
The U. G. I. Contracting Co.

BUCKETS—CLAMSHELL
Geo. Haiss Mfg. Co.

BURNERS (Industrial)
Fuel
The C. M. Kemp Mfg. Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
Carl Still, Incorporated.
Internat'l Coal Carbonization Co.
The Gas Machinery Co.
The Koppers Construction Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
Western Gas Construction Co.
West Gas Improvement Co.

CABLE RAILWAYS
C. W. Hunt Co., Inc.

CALORIMETERS
Alpha-Lux Company (Inc.).
American Meter Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works

CARBONIZATION
Low Temperature
Internat'l Coal Carbonization Co.

CARBURETTED WATER GAS PLANTS
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

CARS
C. W. Hunt Co., Inc.

CAST IRON FITTINGS
James B. Clow & Sons

CEMENTS
The Jersey City Refractories Co. Inc.
M. W. Kellogg Co., The
Russell Engineering Co.
Walsh Fire-Clay Products Co.

CEMENTS, ACID-PROOF
Quigley Furnace Spec. Co., Inc.

CEMENTS, FIREBRICK
M. W. Kellogg Co., The
Quigley Furnace Spec. Co., Inc.
Walsh Fire-Clay Products Co.

CEMENTS, HIGH TEMPERATURE
Refractory
M. W. Kellogg Co., The
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Isbell-Porter Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
Western Gas Const. Co.

CHIMNEY CONSTRUCTION
M. W. Kellogg Co., The

CHUTES
C. W. Hunt Co., Inc.

CLAMPS (PIPE)
S. R. Dresser Manufacturing Co.
Mueller Co.

COALS
Boone County Coal Corp.
Westmoreland Coal Co.

COAL GAS APPARATUS
Bartlett-Hayward Co.
Carl Still, Incorporated.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

COAL & COKE BINS CASTINGS
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Dry Quenching Equipment Corp.
Isbell-Porter Co.
The Koppers Construction Co.
Riter-Conley Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
Western Gas Construction Co.

COAL TAR PRODUCTS
Western Gas Construction Co.

COAL TUBS
C. W. Hunt Co., Inc.

COCKS
Angle Stove
Mueller Co.
Boiler Drain
Mueller Co.
Hose
Mueller Co.
Meter
Kitson Company
Mueller Co.
Service
Kitson Co.
Mueller Co.

COKE CRUSHERS
Semet Solvay Engineering Corp.

COMPUTERS
Heating Value
The U. G. I. Contracting Co.

CONDENSERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
Western Gas Construction Co.
West Gas Improvement Co.
High Duty
The U. G. I. Contracting Co.

CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
Am. Schaeffer & Budenberg Corp.
Bartlett-Hayward Co.
The Gas Machinery Co.
Robertshaw Thermostat Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The U. G. I. Contracting Co.
Taylor Instrument Cos.
Western Gas Construction Co.
Hot Water Heat System
Mueller Co.

CONVEYORS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Isbell-Porter Co.
The Koppers Construction Co.
Semet Solvay Engineering Corp.

CONCENTRATORS AMMONIA
Bartlett-Hayward Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet Solvay Engineering Corp.

COOLERS
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Manufacturing Co.
National Tube Co.
P. H. & F. M. Roots Co.

CRUSHERS
C. W. Hunt Co., Inc.

DERRICK—PIPE
Safety Gas Main Stopper Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Russell Engineering Co.

DOMESTIC INCINERATORS
Home Incinerator Co.
Kernit Incinerator Co.

DRAFT GAUGES
Am. Schaeffer & Budenberg Corp.
Precision Ther. & Inst. Co.

DRILLING MACHINES
Mueller Co.

DRYERS (Clothes)
Lamneck Co., The W. E.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
Craig Ridgway & Son Co.

ENGINE INDICATORS
Am. Schaeffer & Budenberg Corp.

ENGINEERS
Combustion
Bartlett-Hayward Co.
The Improved Equipment Co.
The Koppers Construction Co.
Russell Engineering Co.
Smoot Enginering Corp.
Consulting
Bartlett-Hayward Co.
The Koppers Construction Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
George H. Waring
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Isbell-Porter Co.
The Improved Equipment Co.
The Koppers Construction Co.
Russell Engineering Co.
Semet Solvay Engineering Corp
The Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
West Gas Improvement Co.
Designing
Western Gas Construction Co.

EXHAUSTERS
The Connersville Blower Co.
The Gas Machinery Co.
Isbell-Porter Co.
P. H. & F. M. Roots Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.

EXPANSION BENDS
Mueller Co.

FILES (Steel and Wood)
Remington Rand Business Service, Inc.

FIREBRICK—CHECKER BRICK
The Jersey City Refractories Co., Inc.
Russell Engineering Co.
Semet Solvay Engineering Co.
The U. G. I. Contracting Co.
Walsh Fire-Clay Products Co.
Western Gas Construction Co.

FIREBRICK, CEMENT
Quigley Furnace Spec. Co., Inc.
Walsh Fire-Clay Products Co.

FITTINGS
Isbell-Porter Co.
The Gas Machinery Co.
Mueller Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe & Fdy. Co.
Western Gas Construction Co.

FITTINGS, FLANGED
U. S. Cast Iron Pipe & Fdy. Co.

FITTINGS
Pipe
American Cast Iron Pipe Co.
Semet-Solvay Engineering Corp.

FIXTURES
General Gas Light Co.
Welsbach Co.

FLOORS, IRON, BRICK AND STEEL
Western Gas Construction Co

FLUE PIPE (Cast Iron Oval)
James B. Clow & Sons

FLUES (Consuming) for Gas Range
Akme Flue, Inc.

FURNACES (Case Hardening)
Gas Fired
Warm Air
Geo. D. Roper Co.

MARYLAND METER WORKS

OF

AMERICAN METER COMPANY

INCORPORATED

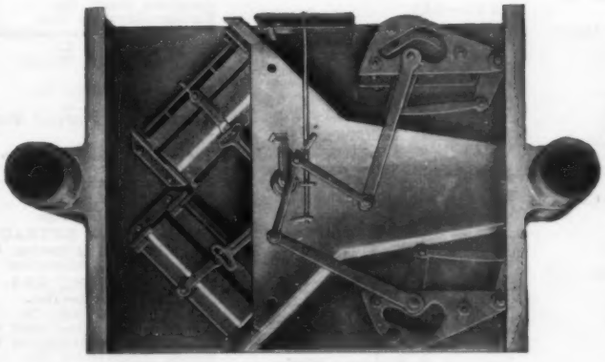
BALTIMORE MARYLAND

MARYLAND "C" TYPE METERS

Double the Hourly Capacity, with Slow Speed Operation

Increased Capacity.
Decreased Installation Cost.
Decreased Maintenance Cost.

Decreased cost for service connections per cubic foot capacity on completed installation.



Showing:
Enlarged valves with special guides; Compound levers for double diaphragms.

Showing:
Double diaphragms with equalizers.

The "C" METER is a NEW development in the larger sizes of THE MARYLAND "B" METER, with Tin Case and retaining the established principle for Positive Displacement Measurement in the two-diaphragm, slide-valve method of Operation.

THE MARYLAND "B" TYPE GAS METERS
THE MARYLAND "C" TYPE GAS METERS

Southern Representative
J. E. Montgomery, 1500 South Tenth Ave., Birmingham, Alabama

Buyers' Reference Index

See page 125 for advertisements of these products

GAS ANALYSIS APPARATUS
American Meter Co.
S. R. Dresser Manufacturing Co.
Metric Metal Works
Precision Ther. & Inst. Co.
The U. G. I. Contracting Co.

GASKETS, ASBESTOS
Safety Gas Main Stopper Co.

GAS MASKS
Safety Gas Main Stopper Co.

GAS PLANTS, COMPLETE
Bartlett-Hayward Co.
Carl Still, Incorporated.
The Gas Machinery Co.
Gas Engineering Co.
The Improved Equipment Co.
Isbell-Porter Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.
West Gas Improvement Co.

GAS TESTING APPARATUS
Alpha-Lux Company, Inc.
Lambert Meter Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
Precision Ther. & Inst. Co.
Superior Meter Co.
The U. G. I. Contracting Co.

GAUGE BOARDS
Am. Schaeffer & Budenberg Corp.
Western Gas Construction Co.

GAUGES
Am. Schaeffer & Budenberg Corp.
American Meter Co.
The Bristol Co.
Connelly Iron Sponge & Gov. Co.
Helme & McIlhenny
Lambert Meter Co.
Maryland Meter Works
Metric Metal Works
Safety Gas Main Stopper Co.
Taylor Instrument Companies
Pressure-Recording
American Schaeffer & Budenberg Co
D. McDonald & Co.
Superior Meter Co.

GLOVES
Rubber
Leather
Safety Gas Main Stopper Co.

GOVERNORS
The Stacey Mfg. Co.
Automatic
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Pittsburgh Equitable Meter Co.
Coke Oven
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
The Gas Machinery Co.
The Koppers Construction Co.
Pittsburgh Equitable Meter Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
District
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Groble Gas Regulator Co.
Helme & McIlhenny
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
Exhauster
Chaplin-Fulton Mfg Co.
Connelly Iron Sponge & Gov. Co.
The Connersville Blower Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co
Smoot Engineering Corp.
High Pressure
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
P. H. & F. M. Roots Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
D. McDonald & Co.
Low Pressure
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
P. H. & F. M. Roots Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
The Gas Machinery Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
Service
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Mueller Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Station
The Sprague Meter Co.
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Helme & McIlhenny
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Semet Solvay Engineering Corp.
Station Automatic
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Pittsburgh Equitable Meter Co.

GRAVITOMETERS
Precision Thermometer & Instrument. Co.
Taylor Instrument Cos.

HEATERS
Room
James B. Clow & Sons
General Gas Light Co.
Homestead Heater.
Welsbach Company

HEATERS (WATER)
Hot Water
Electric Porcelain & Mfg. Co.
Humphrey Co.
Kompak Company
Welsbach Co.
House
American Gas Products Corp.

HOISTS
C. W. Hunt Co., Inc.
Geo. Haiss Mfg. Co., Inc.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Koppers Construction Co.
Riter-Conley Co.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
Western Gas Construction Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
Riter-Conley Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
The Improved Equipment Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.

HYDROMETERS
Precision Ther. & Inst. Co.
Taylor Instrument Companies

INCINERATORS—GAS FIRED
Home Incinerator Co.
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
Geo. D. Roper Corp.

INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

INSTRUMENTS
Am. Schaeffer & Budenberg Corp.
The Bristol Co.
Metric Metal Works
Precision Ther. & Inst. Co.
P. H. & F. M. Roots Co.
Taylor Instrument Cos.
The U. G. I. Contracting Co.
Recording
Am. Schaeffer & Budenberg Corp.
Alpha-Lux Company, Inc.
Superior Meter Co.

JOINTS (Pipe)
Southwest Pipe Joint & Eng. Co.
Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Insulating
Semet-Solvay Engineering Corp.
The U. G. I. Contracting Co.

JOINT RUNNERS
Safety Gas Main Stopper Co.

LAMPS
General Gas Light Co.
Kitson Co.
Welsbach Co.

LAMP POSTS
General Gas Light Co.
Kitson Co.
Welsbach Street Lighting Co. of America

LOADERS—BUCKET, PORTABLE
Geo. Haiss Mfg. Co.

LOOSE LEAF EQUIPMENT
Remington Rand Business Service, Inc.

MANILA & WIRE ROPE
C. W. Hunt Co., Inc.

MANTLES
General Gas Light Co.
Welsbach Co.

MASKS—GAS
Melters
Connelly Iron Sponge & Gov. Co.
The Safety Gas Main Stopper Co

MAST & GAFF OUTFITS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.

MEASURING CHUTES
C. W. Hunt Co., Inc.

METERS
Air
American Meter Co.
The Connersville Blower Co.
John J. Griffin & Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works
Neptune Meter Co.
Pittsburgh Equitable Meter Co.
P. H. & F. M. Roots Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
The U. G. I. Contracting Co.
Artificial
American Meter Co.
John J. Griffin & Co.
Helme & McIlhenny
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Neptune Meter Co.
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Demand
D. McDonald & Co.
Dry
American Meter Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Natural Gas
American Meter Co.
The Connersville Blower Co.
John J. Griffin & Co.
Helme & McIlhenny
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
P. H. & F. M. Roots Co.
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Oil
Western Gas Construction Co.
Prepayment
American Meter Co.
John J. Griffin & Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Station
American Meter Co.
The Connersville Blower Co.
The Gas Machinery Co.
John J. Griffin & Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
P. H. & F. M. Roots Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Steam
The U. G. I. Contracting Co.
Test
American Meter Co.
John J. Griffin & Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works

METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Manufacturing Co.
D. McDonald & Co.
Maryland Meter Works
Mueller Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works

MIXERS, GAS
The C. M. Kemp Mfg. Co.
Geo. D. Roper Corp.
Smoot Engineering Corp.

MOTOR CARS
C. W. Hunt Co., Inc.

NAPHTHALENE EXTRACTORS
Semet-Solvay Engineering Corp.
Western Gas Consruction Co.

OVENS COKE AND GAS
Carl Still, Incorporated.
The Gas Machinery Co.
The Improved Equipment Co.
The Koppers Construction Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.

OXIDE
Alpha-Lux Company, Inc.
Connelly Iron Sponge & Gov. Co.
Gas Purifying Materials Co., Inc
E. J. Lavino & Co.

PACKING
Asbestos
Jute
The Safety Gas Main Stopper Co.

PAINTS
Jos. Dixon Crucible Co.
The U. G. I. Contracting Co.
Wailes Dove-Hermiston Corp.

PAINTS, ANTI ACID AND ALKALI
Quigley Furnace Spec. Co., Inc.

PAINTS
Graphite
Jos. Dixon Crucible Co.

PAINTS, RUSTPROOF
Quigley Furnace Spec. Co., Inc.

PHOTOMETERS (JET)
Connelly Iron Sponge & Gov. Co.

PHOTOMETERS
Lambert Meter Co.
The U. G. I. Contracting Co.
Warren Foundry & Pipe Co.

PIPE
Bartlett-Hayward Co.
Cast Iron Pipe Publicity Bureau
National Tube Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe & Fdy. Co.
Western Gas Construction Co.

5-A Meter

A-METERS

	Capacity at 0.5 in. differential
5-A	175 cubic feet per hour
10-A	375 cubic feet per hour
30-A	875 cubic feet per hour
60-A	1500 cubic feet per hour
150-A	3400 cubic feet per hour

B-METERS

	Capacity at 0.5 in. differential
5-B meter	150 cubic feet per hour
10-B meter	300 cubic feet per hour
20-B meter	450 cubic feet per hour
30-B meter	600 cubic feet per hour
60-B meter	1300 cubic feet per hour
100-B meter	1800 cubic feet per hour

5-B Meter

HELME & McILHENNY

OF

AMERICAN METER COMPANY
INCORPORATED

17th and Clearfield Streets
Philadelphia, Pa.

ESTABLISHED 1848

Buyers' Reference Index

See page 125 for advertisements of these products

Bell
Donaldson Iron Co.
Cast Iron
James B. Clow & Sons
Donaldson Iron Co.
McWane Cast Iron Pipe Co.
Copper Service
Mueller Co.
Flange
Donaldson Iron Co.
U. S. Cast Iron Pipe & Fdy. Co.
Spigot
Donaldson Iron Co.
Steel
Smith Corpn., A. O.
Welded Steel
The Stacey Mfg. Co.
Semet-Solvay Engineering Corp.

PIPING (High Pressure)
M. W. Kellogg Co.

PIPE COATINGS
Wailes Dove-Hermiston Corp.

PRESSURE HOLDERS
The Stacey Bros. Gas Const. Co.

PLATES
Floor
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Co.
Russell Engineering Co.
The Stacey Mfg. Co.

PLUGS SERVICE AND MAIN
Rubber
Soft Wood
The C. M. Kemp Mfg. Co.
Soft Wood
The Safety Gas Main Stopper Co.

PRODUCER GAS PLANT
Gas Engineering Co.
The Gas Machinery Co.
The Koppers Construction Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

PROVERS—METER
American Meter Co.
Helme & McIlhenny
Lambert Meter Co.
D. McDonald & Co.
Pittsburgh Equitable Meter Co.
Superior Meter Co.

PUMPS
Lambert Meter Co.
P. H. & F. M. Roots Co.
Superior Meter Co.
Drip
The Connersville Blower Co.
D. McDonald & Co.
Mueller Co.
George D. Roper Corp.
Gas Bag
The Safety Gas Main Stopper Co.
Hand
George D. Roper Corp.
Oil
The Connersville Blower Co.
D. McDonald & Co.
George D. Roper Corp.
Semet Solvay Engineering Corp.
Power
George D. Roper Corp.
Pressure
D. McDonald & Co.
Service
The Safety Gas Main Stopper Co.
Service Cleaner
Mueller Co.
Tar
The Connersville Blower Co.
D. McDonald & Co.
George D. Roper Corp.
P. H. & F. M. Roots Co.
Semet Solvay Engineering Corp.
Vacuum
D. McDonald & Co.
P. H. & F. M. Roots Co.
Water
George D. Roper Corp.

PURIFIERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

PURIFYING MATERIALS
Alpha-Lux Company, Inc.
Connelly Iron Sponge & Gov. Co.
Cruse-Kemper Co.
Gas Purifying Materials Co., Inc.
Lavino, E. J., & Co.

PURIFIER TRAYS
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.

PYROMETERS
Indicating
Recording
The Bristol Co.
Taylor Instrument Companies
Optical
Radiation
Pyrometer Instrument Co.

RADIATORS
Gas Steam
Gas Water
James B. Clow & Sons

RANGES—GAS
American Stove Co.
Electric Porcelain & Mfg. Co.
Geo. D. Roper Corp.

REAMERS
Pipe End
Mueller Co.

REFRACTORY CEMENTS
Quigley Furnace Spec. Co., Inc.
Walsh Fire-Clay Products Co.

REFRACTORY GUN
Quigley Furnace Spec. Co., Inc.

REFRACTORY LININGS
Alpha-Lux Company, Inc.
The Gas Machinery Co.
The Jersey City Refractories Co. Inc.
E. J. Lavino & Co.
Russell Engineering Co.
Quigley Furnace Spec. Co., Inc.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
Walsh Fire-Clay Products Co.

REGULATORS
Am. Schaeffer & Budenberg Corp.
American Stove Co.
The Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Isbell-Porter Co.
Groble Gas Regulator Co.
Minneapolis Heat Regulator Co.
Mueller Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
P. H. & F. M. Roots Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
The Wilcolator Co.

RETORT CEMENT
Alpha-Lux Company, Inc.
The Improved Equipment Co.
The Jersey City Refractories Co. Inc.
E. J. Lavino & Co.
Quigley Furnace Specialties Co., Inc.
Russell Engineering Co.
Walsh Fire-Clay Products Co.

RETORTS
The Jersey City Refractories Co. Inc.
E. J. Lavino & Co.
Riter-Conley Co.
Walsh Fire-Clay Products Co.
Horizontal and Inclined
Silica and Clay
The Gas Machinery Co.
The Improved Equipment Co.
Russell Engineering Co.
Walsh Fire-Clay Products Co.
Silica and Clay
The Gas Machinery Co.
The Improved Equipment Co.
The Jersey City Refractories Co. Inc.
Russell Engineering Co.
Walsh Fire-Clay Products Co.
Vertical
The U. G. I. Contracting Co.
West Gas Improvement Co.

SAFES
Cabinet and File
Remington Rand Business Service, Inc.

SCALES
C. W. Hunt Co., Inc.

SCRUBBERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

SERVICE BOXES
Mueller Co.

SERVICE PLUG—RUBBER
The Safety Gas Main Stopper Co.

SKIP HOISTS
C. W. Hunt Co., Inc.

SPONGE
Alpha-Lux Company, Inc.
Connelly Iron Sponge & Gov. Co.
Gas Purifying Materials Co., Inc.
Lavino, E. J., & Co.

STATION METERS
American Meter Co.
The Connersville Blower Co.
The Gas Machinery Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
P. H. & F. M. Roots Co.

STATIONERY—LITHOGRAPH
Remington Rand Business Service, Inc.

STEAM ACCUMULATORS
The Gas Machinery Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The U. G. I. Contracting Co.

STOPPERS
The Safety Gas Main Stopper Co.

STREET DEPT. EQUIPMENT
The Safety Gas Main Stopper Co.

STOVES—GAS
Electric Porcelain & Mfg. Co.
Geo. D. Roper Corp.

STREET LAMPS
General Gas Light Co.
Kitson Co.
Welsbach Street Lighting Co. of America

SYSTEMS
Combustion Control
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
Hot Water Heat Control
Mueller Co.

TACHOMETERS
Precision Ther. & Inst. Co.

TANKS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Co.
Pittsburg Water Heater Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
Western Gas Construction Co.
High Pressure
The Stacey Mfg. Co.

TANK REGULATORS
Am. Schaeffer & Budenberg Corp.

TAPE, SOAP—BINDING
The Safety Gas Main Stopper Co.

TAPPING MACHINES
Mueller Co.

TAR DISPLACEMENT SYSTEM
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

TAR DISTILLING PLANTS
Carl Still, Incorporated.
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Co.
Semet-Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.

TAR EXTRACTORS
Bartlett-Hayward Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

TEMPERATURE CONTROLLING DEVICE
Am. Schaeffer & Budenberg Corp.
American Stove Co.
The Bristol Co.
Robertshaw Thermostat Co.
Taylor Instrument Cos.
The Wilcolator Co.

THERMOSTATS
The Bristol Co.
Robertshaw Thermostat Co.
Taylor Instrument Cos.
The Wilcolator Co.

THERMOMETERS
Am. Schaeffer & Budenberg Corp.
American Meter Co.
The Bristol Co.
Cooper Oven Thermometer Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works
Precision Ther. & Inst. Co.
Semet Solvay Engineering Corp.
Superior Meter Co.
Taylor Instrument Companies

TOOLS
Caulking
Mueller Co.

TOOLS, PIPE GANG
The Safety Gas Main Stopper Co.

TRAPS—STEAM
Am. Schaeffer & Budenberg Corp.

TRENCH DIGGERS—
Cleveland Trencher Co.
Geo. Haiss Mfg. Co., Inc.

TUBES, BOILER
National Tube Co.

TYPEWRITERS
Remington Rand Business Service, Inc.

U GAUGES
Am. Schaeffer & Budenberg Corp.

VACUUM GAUGES
Precision Ther. & Inst. Co.

VALVES
Am. Schaeffer & Budenberg Corp.
Bartlett-Hayward Co.
The Bristol Co.
James B. Clow & Sons
The Gas Machinery Co.
Isbell-Porter Co.
The Ludlow Valve Mfg. Co.
Metric Metal Works
Mueller Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
Taylor Instrument Cos.
The U. G. I. Contracting Co.
Western Gas Construction Co.

VALVES—COAL AND ASH VALVES
C. W. Hunt Co., Inc.

VISIBLE RECORD EQUIPMENT
Remington Rand Business Service, Inc.

WASTE HEAT BOILERS
Bartlett-Hayward Co.
The Gas Machinery Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
West Gas Improvement Co.
Western Gas Construction Co.

WATER GAS APPARATUS
Bartlett-Hayward Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

WATER GAS GENERATORS
Semet-Solvay Engineering Corp.
Western Gas Const. Co.

WATER HEATERS
Electric Porcelain & Mfg. Co.
James B. Clow & Sons
Humphrey Co.
Welsbach Co.

WEIGH LARRIES
C. W. Hunt Co., Inc.

YARN, CAULKING
The Safety Gas Main Stopper Co.

D. McD. & Co.
MADE RIGHT
McDONALD
DIAPHRAGMS
STAY TIGHT
MADE RIGHT
McDONALD
DIAPHRAGMS
STAY TIGHT
D. McDONALD & Co.
AMERICAN METER COMPANY
INCORPORATED
ALBANY, N. Y.
MANUFACTURERS OF
Gas Meters Diaphragms
Station Meters
Provers Calorimeters
Gauges Cubic Foot Standards
AND
APPARATUS
OF
EVERY DESCRIPTION
Established 1856
ONE CUBIC FOOT

METRIC METAL WORKS

OF

AMERICAN METER COMPANY

INCORPORATED

ERIE, PA.

—

METERS FOR NATURAL GAS

METERS FOR MANUFACTURED GAS

OUR experts have made a particular study of natural gas conditions and requirements. The result of their experience is at your service.

ALPHABETICAL LIST OF ADVERTISERS

Akme Flue, Inc. 110
Alpha Lux Co. 112
American Cast Iron Pipe Co. 111
American Gas Products Corp. 86
American Lava Corp. 102
American Meter Co. 127
American Schaeffer and Budenberg Corp. 104
American Stove Co. 91

Bartlett Hayward Co. 22
Boone County Coal Corpn. Front Cover
Bristol Co., The 96
Byllesby Engineering & Management Corp. 102

Cast Iron Pipe Research Assn. 101
Chaplin-Fulton Mfg. Co. 96
Cleveland Trencher Co., The 105
Clow & Sons, James B. 79
Connelly Iron Sponge & Governor Co. 117
Connersville Blower Co. 11
Cooper Oven Thermometer Co., The 98
Cruse-Kemper Co. 10

Dixon Crucible Co. 94
Dresser, S. R., Mfg. Co. 21
Dry Quenching Equipment Corp. 9

Electric Porcelain & Mfg. Co. 112

Gas Engineering Co. 117
Gas Machinery Co. 8
Gas Purifying Materials Co. 104
General Gas Light Co. 93
Groble Gas Regulator Co. 112

Haiss Manufacturing Co., Inc., Geo. 100
Helme & McIlhenny 121
Homestead Heater Co. 83
Humphrey Company 95
Hunt, C. W., Co. 16

Improved Equipment Co. 15
Isbell-Porter Co. 110

Jersey City Refractories Co. 110

Kellogg Co., Inc., M. W. 57
Kemp Mfg. Co. 110
Kitson Company 113
Kompak Company 56

Lambert Meter Co. 106
Lamneck Co., The W. E. 106
Lavino & Co., E. J. 116
Ludlow Valve Co. 106

Maryland Meter Works 119
Metric Metal Works 124
Minneapolis Honeywell Regulator Co. 92
McDonald & Co., D. 123
McWane Cast Iron Pipe Co. 107
Mueller Company 14

National Tube Co. 109
Neptune Meter Co. 112

Pacific Coast Gas Association 114
Pittsburgh Equitable Meter Co. 97
Precision Thermometer & Instrument Co. 98
Pyrometer Instrument Co. 20

Quigley Furnace Specialties Co. 89

Remington Rand Business Service, Inc. 87
Reynolds Gas Regulator Co. 18
Riter-Conley Co. 104
Robertsaw Thermostat Co. 81
Roots Co., P. H. & F. M. 99
Russell Engineering Co. 112

Safety Carboy Holder & Truck Corpn. 117
Safety Gas Main Stopper Co. 100
Semet-Solvay Engineering Corp. 5
Smith Corp., A. O. 13
Smoot Engineering Co. 6
Sprague Meter Co. 103
Stacey Brothers Gas Construction Co. 55
Stacey Manufacturing Co. 4
Still Corp., Carl 12
Superior Meter Co. 89
Southwestern Pipe Joint & Engineering Corpn. 58

Taylor Instrument Co. 102
Tufts Meter Works, Nathaniel 126

Unger, John S. 117
U. G. I. Contracting Co., The 7
U. S. Cast Iron Pipe Co. Fourth Cover
United Engineers & Constructors, Inc. 17

Walsh Fire Clay Products Co. 112
Waring, George H. 117
Welsbach Company 77
Western Gas Construction Co. 2
West Gas Improvement Co. of America 19
Westmoreland Coal Co. 116

BUYERS' REFERENCE INDEX, PAGES 118, 120, 122

LOOKING BACKWARD 30 YEARS

The Use of Gas Has Increased 500% Since 1895

Notwithstanding the loss of a large percentage of gas lighting, the diversified use of gas for domestic and industrial purposes has very materially increased the sales per meter.

The peak demand load is constantly increasing and is of such a nature that volume, as well as pressure, is required for the best results.

From a study of the individual records of several hundred thousand meters, summarized according to the system of the

FOUR CARDINAL POINTS

it is very evident that meters with additional capacity for the volume required hold their proof far better and have a longer life than meters which are overloaded and overworked.

LOOKING AHEAD 30 YEARS

The Lifetime of Our Meters

We strongly urge the placing of meters of greater capacity and volume for domestic and industrial customers where surroundings and industry indicate a prospective increased use of gas.

Capacities at One-Half Inch Loss in Pressure

5-B Capacity	150 Cu. Ft. Per Hour	100-B Capacity	1,800 Cu. Ft. Per Hour
10-B Capacity	300 Cu. Ft. Per Hour	150-B Capacity	3,000 Cu. Ft. Per Hour
20-B Capacity	450 Cu. Ft. Per Hour	250-B Capacity	4,500 Cu. Ft. Per Hour
30-B Capacity	600 Cu. Ft. Per Hour	500-B Capacity	7,500 Cu. Ft. Per Hour
50-B Capacity	1,250 Cu. Ft. Per Hour		

19 Years Experience

With the B-Type Meter

1860 **67 Years in Boston** **1927**

Manufacturing the Glover Type Meters

NATHANIEL TUFTS METER WORKS

of

American Meter Company, Inc.

455 Commercial Street

AMERICAN METER COMPANY

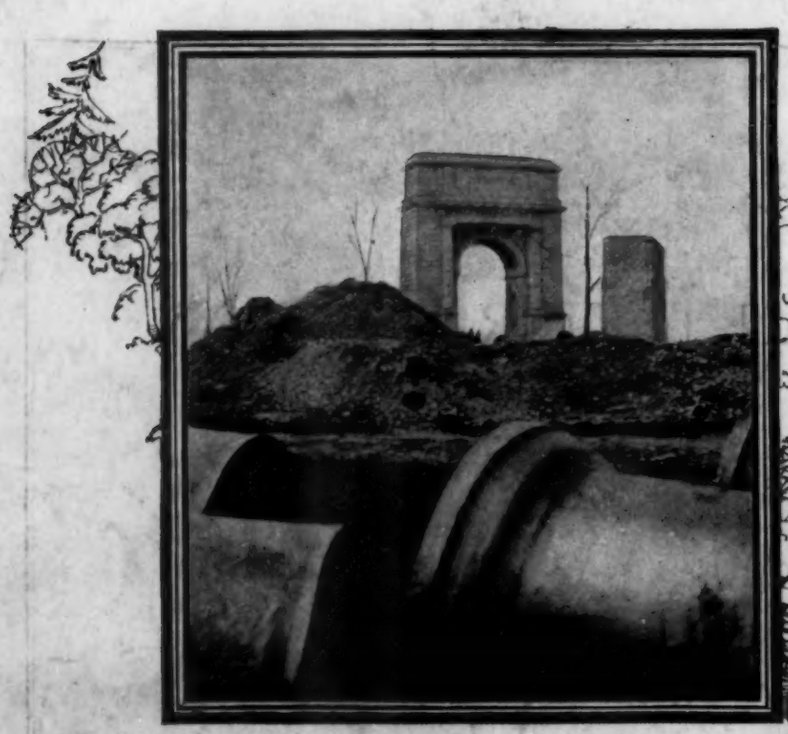
INCORPORATED

MEASUREMENT ENGINEERS

QUALITY METERS

TO MEASURE GAS IN
ANY QUANTITY

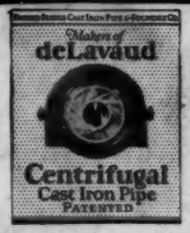
105 WEST 40th STREET
New York



Bell and Spigot Cast Iron Pipe protects the nation's monuments at historic Valley Forge

WHERE permanence, safety and lower maintenance costs are factors, cast iron pipe is specified and used.

Write for new illustrated hand-book which contains full specifications and other valuable data for construction engineers.



United States Cast Iron Pipe and Foundry Company

General Offices:
Burlington, New Jersey

SALES OFFICES

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 957 East Ferry Street
Cleveland: 1150 East 26th Street
New York: 71 Broadway
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Minneapolis: 6th St. & Hennepin Ave.